



JPRS Report

Telecommunications

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Telecommunications

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USSR-Denmark Fiber-Optic Link Agreed Upon

*91WT0165A Copenhagen BERLINGSKE TIDENDE
in Danish 1 Aug 91 p II 2*

[Text] Finally, after three years of negotiation, the agreement on a fiber optic sea cable system between Denmark and the Soviet Union was reached on Wednesday. This establishes the first fiber optic cable system between the Soviet Union and the surrounding world—a cable net that beginning in mid-1993 will be able to send telephone, telefax, data, and video connections out of the country on a large scale.

GN Store Nordiske Telegraf-Company, Inc., and Tele Danmark, Inc.'s subsidiary, Telecom, Inc., will each provide half of the one-half billion kroner financing for the project. On Wednesday the companies made an agreement with the English firm STC Submarine System for the delivery of the sea cables.

The income from the tele-traffic will go exclusively to the Danish companies until the 500 million kroner is covered. After this, according to the agreement between the Soviet Communications Ministry and the Danish companies, the income will be divided equally between the partners.

"It is usually good business to build telephone connections, so we think that the investment will pay for itself in a few years," Jens Kiil said.

The cable will connect Kingisepp at Leningrad with Copenhagen, a distance of about 1,260 km—and the system is the first part of the planned trans-Soviet line, TSL.

The traffic will be sent from Kingisepp to Leningrad and Moscow.

IBM in China Joint Venture

WA1908140191 Hong Kong SOUTH CHINA
MORNING POST—COMPUTERS & TECHNOLOGY
in English 25 Jun 91 p 1

[Article by James Riley]

[Text] IBM Corp has officially opened its second China joint venture: a Shenzhen-based software development shop.

International Software Development (ISD) Shenzhen is a joint project between IBM China-Hongkong, the Bank of East Asia and Shenzhen University.

Established to develop systems and application software for both domestic and export markets, the company will initially employ about 100 local engineers.

It is expected to employ about 500 by the end of 1994.

IBM's only other joint venture in China is a factory in Tianjin, opened last year, which produced Personal System/2 computers.

IBM's most senior representative in the region, Mr. Ned Lautenbach, said ISD was one of some 60 major joint ventures in the Asia-Pacific region.

Mr. Lautenbach said the software industry was the fastest growing sector of the information industry, worth about US\$70 billion a year.

"Small companies like ISD generate about half of that revenue, and produce some of the most innovative products," Mr. Lautenbach said.

The most successful companies of the 1990's would be those that were able to simplify the use of computers in Chinese, and other high-use languages, he said.

Shenzhen's vice-mayor Zhu Yuening said software was regarded as the key to the area's continuing economic success.

The venture was set up with initial capital of about \$2.2 million. Although IBM is a minority shareholder, it lent management expertise to fill senior positions.

Mr. Ying Qirui, associate president of Shenzhen University, has been named chairman of ISD. The general manager will be Mr. Theron Fok, who previously held senior positions in software development with IBM Canada.

ISD will go into production next month, focusing on applications, systems programming services, Chinese-language functions and consultancy and systems integration services.

IBM has already said it may enter similar arrangements elsewhere in China, although no firm plans have been announced.

Shenzhen was chosen as the site for the first venture because of its established pool of software development talent.

Latest Reports on Fiber-Optic Communications**Lines To Be Completed**

91P60241A Beijing DIANXIN JISHU
[TELECOMMUNICATIONS TECHNOLOGY]
in Chinese No 7, Jul 91 p 47

[Untitled news brief by Huang Wenquan [7806 2429 6898]]

[Summary] MPT plans to complete cable laying on two State Eighth 5-Year Plan priority fiber-optic-cable projects—the 2500-km-long Shanghai-Hangzhou-Fuzhou-Guangzhou line and the 400-km-long Shanghai-Nanjing line—by winter of this year or spring of next year. Construction and management for these 2900-km-total southern coast projects is being handled by the Communications Construction Corporation (CCC). Supported by MPT and other organizations, CCC engineers recently visited various foreign companies—including Japan's Anritsu, Fujikura, and Sumitomo; the U.S.'s Hewlett-Packard and York; Sweden's Ericsson; and Germany's ANT—to conduct technical exchanges and for selection of fiber-optic cable instruments, and afterwards placed their orders for the foreign-made goods with the P&T Equipment Corporation.

Line Under Construction

91P60241B Beijing DIANXIN JISHU
[TELECOMMUNICATIONS TECHNOLOGY]
in Chinese No 7 Jul 91 p 47

[Untitled news brief by Yu Dong [5038 0392]]

[Summary] Cable laying for the Xuzhou-Huaiyin County fiber-optic-cable trunkline funded by the Jiangsu Province P&T Office began in April 1991. This 219.7-km-long line runs from the Huaiyin Communications Tower through Siyang, Yanghe, Suqian, Suining, and Shuanggou, and terminates at the Xuzhou P&T Office's Telephone & Telegraph Building.

Microcomputer Developed

91P60241C Beijing DIANXIN JISHU
[TELECOMMUNICATIONS TECHNOLOGY]
in Chinese No 7 Jul 91 p 47

[Untitled news brief by DIANXIN JISHU staff; cf. JPRS-CST-91-015, 9 Jul 91 p 29]

[Summary] A "fiber-optic broadband integrated services distributed microcomputer LAN" completed by Nanjing Institute of Posts & Telecommunications passed the recent appraisal organized in Nanjing by the Jiangsu Province S&T Commission. Based on a commercial microcomputer LAN supplemented by specially developed and expanded software and hardware, the new

system can transmit over optical fiber several types of information, including color dynamic imagery. Targeted fields of application for this broadband integrated services LAN include industry, government office automation, production process control, imagery monitoring, and military command.

Dutch-Funded Optical Fiber Plant Operational

*WA1000071 Beijing BEIJING REVIEW in English
15-21 Jul 91 p 30*

[Text] The Changfei Optical Fibre and Cable Co. Ltd., a Sino-Dutch joint venture, has recently gone into operation after three years of construction. It is the largest of its kind in China.

The new hi-tech venture was funded by the Wuhan Optical Communications Technology Co., the Wuhan

Trust and Investment Co. and Philips Co. of the Netherlands. Total investment for the venture came to 72.5 million guilders plus 56 million yuan. Cooperation spans 20 years. Sixty percent of foreign capital was contributed by the Dutch government as loans, while the remainder was stock contributed equally by both sides.

By adopting Philips' world-leading PVCD technology, the optical cable manufacturing techniques of the Dutch Electronic Cable Co. and advanced management, the venture will produce 50,000 km of optical fibres and 4,500 km of cables a year. Annual output value will be around 150 million yuan.

Chinese experts said that the Changfei operations have brought China's reliance on import of optical fibre to an end. The plant will meet domestic demand and export 20 percent of its products.

POLAND

Executive Order on Telecommunications Equipment

91EP0527Z Warsaw DZIENNIK USTAW in Polish
No 34, 23 Apr 91 Item No 154 p 480

[Executive Order of the minister of communications dated 15 April governing telecommunications equipment, lines, and networks, the installation and use of which do not require a permit]

[Text] Pursuant to Article 13 of the Law, dated 23 November 1990, on Communications (Dz.U [DZIENNIK USTAW], No. 86, Item No. 504), the following is decreed:

Paragraph 1. Permits are not required for the installation and operation of the following:

1) Cable lines and telecommunications networks which are not connected directly or indirectly to the public telecommunications network, which are installed and used within the confines of built-up structures that amount to a technical and organizational entity, and which are located in the compounds of a single or many adjacent real estate properties, with the exception of collective-reception radio and TV networks.

2) In-house wire telecommunications network, installed and used in the facilities referred to in Paragraph 1, which cooperate with the public telecommunications network, with the exception of the internal telecommunications networks that make it possible to switch connections from the public telecommunications network to internal equipment without intermediate notification.

3) Peripheral telecommunications equipment, in particular telephones, telefaxes, teletypewriters, and radio telephones, if they are not used to provide paid telecommunications services to third parties.

4) Transmitting and transmitting-receiving radio communications equipment operating with an output power of no more than 20 mW at a frequency of 26,940 MHz plus or minus 5 kHz.

5) Radio and TV sets for general reception, and satellite receivers for individual reception.

Paragraph 2. The present executive order takes effect after 14 days have elapsed from the day of publication.

Minister of Communications: J. Slezak

Executive Order on Telecommunications Operations

91EP0527Y Warsaw DZIENNIK USTAW in Polish
No 31, 12 Apr 91 Item No 130 pp 434-444

[Executive Order of the Minister of Communications dated 18 March governing technical and operational

requirements for telecommunications installations, lines, networks, and conditions for their cooperation with the public telecommunications network]

[Text] Pursuant to Article 9, Points 2 and 3 of the Law, dated 23 November 1990, on Communications (Dz.U. [DZIENNIK USTAW], No. 86, Item No. 504), the following is decreed:

Paragraph 1. The network of mobile inland radio communications established and operated in the territory of the Republic of Poland, which operates in the frequency band of 450 MHz, should meet the technical and operational requirements and conditions for cooperation with the public telecommunications network outlined in an annex to the present executive order.

Paragraph 2. The present executive order takes effect when seven days have elapsed since the day of publication.

[Signed] Minister of Communications: J. Slezak

Basic Technical and Operational Requirements for a Mobile Inland Radio Communications Network with a Cellular Structure Established and Operating in the Territory of the Republic of Poland in the 450 MHz Frequency Band, and Conditions for Its Cooperation With the Public Telecommunications Network

I. Subject of Requirements

Paragraph 1. The requirements apply to an inland, mobile, analog radio communications network with a cellular structure established and operated in Poland in the frequency band of 450 MHz, henceforth referred to as "a cellular network."

Paragraph 2. A cellular network consists of:

1) Automatic radio telephone exchanges, henceforth referred to as "ACR's," which are program-driven, which control radio networks in specific regions or the entire network in the country, and which ensure the linkage between the cellular network and the public telephone network through an automatic long-distance exchange, henceforth referred to as an "ACMM," or a local center; the ACR's also meter communications coming into the network or originating in it.

2) Base stations, henceforth referred to as "SB's," which are designed to serve individual cells and consist of an adequate number of radio transmitters and receivers, which are equipped with devices controlling and governing the use of channels within a cell, and which cooperate with the ACR's in the process of locating and identifying mobile stations.

3) Circuits between the SB's and the ACR's, and between the ACR's and the ACMM's (or local exchanges), which are built using copper cables, fiber optics, or microwave radio lines.

4) Subscriber radiotelephone stations, henceforth referred to as the "SR's," which move within the service

area of a cellular network, or are stationary, located along roads in the country, and available to the general public.

II. Determination of the System and Equipment of a Cellular Network

Paragraph 3. The version of the NMT 450 [Nordic Mobile Telephone] system with intervals between channels equal to 25 kHz is used in the cellular network, which provides for using:

1) Half-channels with intervals between channels equal to 12.5 kHz.

2) Compandors in the acoustic circuit.

3) An improved automatic system corresponding to the NMT 900 system, including a system for confirming the identification of the subscriber station.

Paragraph 4. The following frequency bands are assigned for the cellular network: 452,500-457,000 MHz, and 462,500-467,000 MHz.

Paragraph 5. On each channel, the transmitter of the base station operates on the higher frequency, and that of the mobile station on the lower frequency.

Paragraph 6. All mobile stations should be capable of operating on all channels.

Paragraph 7. The total busy time of all radio channels for speech or signals provided for a cellular network cannot exceed three minutes per one hour with the highest amount of traffic within an area served by one base station, with the intensity of traffic being at least 2 Erl per square kilometer.

Paragraph 8. If radio lines are used as circuits in a cellular network, it is permissible to use the following frequency bands in them:

1) For a wide range of applications: 8, 11, 13, 18 GHz.

2) In individual cases: 4, 6 GHz.

Frequency channels for transmission (analog or digital) are positioned pursuant to the recommendations of the International Advisory Committee for Radio Communications, which is henceforth referred to as the "CCIR."

Paragraph 9. At the very least, the equipment of a cellular network should ensure:

1) A call with a view to starting a conversation initiated by a mobile station and directed to a public telephone network user who is located:

a) Within the area of a local network (including connections with services rescuing the life and assets of the people).

b) In any area of the country.

c) In the territory of any other country.

2) A call with a view to starting a conversation initiated by a user of the public telephone network of Poland or another country (stationary or mobile) with a mobile station within the area of its parent ACR.

3) A call with a view to starting a conversation, initiated by a user of the public telephone network or a mobile station, with a mobile station located in the area of an ACR other than its parent ACR.

4) A call with a view to starting a conversation, initiated by a user of the public telephone system, and directed to another user of that system, but effected on the order of the mobile station called (forwarded calls).

5) Calls intended to transmit service signals necessary for the operation of a cellular network.

Paragraph 10. If a mobile subscriber moves between zones served by different ACR's, including along national roads, the cellular network should ensure the opportunity to establish all the connections referred to in Paragraph 9 without interrupting the call (roaming).

III. Conditions for Cooperation Between a Cellular Network and the Public Telephone Network

Paragraph 11. Cooperation between a cellular network and the public telephone network is effected through the ACR-ACMM contact or through ACR-local exchange. Separate circuits between different ACR's and between each ACR and the SB's belonging to it may be used in the cellular network.

Paragraph 12. ACR radio exchanges are connected to automatic long-distance exchanges ACMM (or to local exchanges)—digital or analog, electromagnetic with SPC program control with a four-wire connection—by means of single-marker outgoing and incoming quads which operate under the PCM 30 system, using R2 linear signals or the No. 7 Signal System.

Paragraph 13. An opportunity for full or partial serialization of connections by cooperating ACMM exchanges should be provided for outgoing traffic of the ACR's. Under partial serialization, an ACMM exchange should accept only the segment of the digits in the number of the subscriber called which is necessary in the process of establishing a connection, in order to determine the direction (and possibly the rate). The subsequent digits, when the R2 logging signal also follows, should be exchanged (upon the switching of fields by the ACMM exchange) between the ACR exchange and the subsequent exchange in the chain.

Paragraph 14. Cooperating exchanges should operate under partial serialization in the case of traffic coming into the ACR.

Paragraph 15. An ACR exchange should provide for an opportunity to connect to it the PCM 30 numerical path through a standard contact point meeting the recommendations of the Blue Book G 703.6 of the International Advisory for Telegraph and Telephones, which will

henceforth be referred to as the "CCITT" (for a binary quantity of flow of 2,048 kbit/s).

Paragraph 16. An ACR exchange cooperating with an ACCM (or intermediate) exchange through numerical circuits should ensure the application of a signal system:

- 1) Linear R2.
- 2) Logging A2.
- 3) CCITT No. 7 if the ACMM exchange cooperating with the ACR is equipped with this system of signals.

Paragraph 17. ACR exchanges should generate the following tone signals at a frequency of 425 plus or minus 25Hz, which are transmitted toward ACMM's or local exchanges:

- a) A response signal to calling which is transmitted with the following rhythm: emission 1,000 ms plus or minus 10 percent, silence 4,000 ms plus or minus 10 percent.
- b) A routing signal (for the duration of waiting for the completion of a connection) which is transmitted with the following rhythm: emission 50 ms plus or minus 10 percent, silence [number omitted in the original] plus or minus 10 percent.

The power output of the signals referred to above measured at the exit from the exchange should amount to - 10 dBmO plus or minus 5 dB at 800 ohms resistance.

IV. Numbering of Mobile Subscribers in the Telephone Network

Paragraph 18. An ACR exchange should be equipped to transmit the following lengths of phone numbers:

- 1) National, consisting of four to eight digits ending in the sign "end of selection" (I-15).
- 2) International, consisting of "0" plus between six and 12 digits ending in the sign "end of selection" (I-15).
- 3) Access to special subscriber services—through three or four digits in the form "9XY" or "96XY" which end in the sign "end of selection" (I-15).

Paragraph 19. The form of the number of a domestic mobile station of the cellular network should be "90X₁X₂X₃X₄X₅X₆, where "90" indicates the index of a cellular network, and X₁X₂X₃X₄X₅X₆ indicates the number of a domestic mobile station in a given ACR exchange.

Paragraph 20. While effecting any connection, a mobile station of the cellular network selects a complete domestic number. The "end of selection" sign is added to this information, and the latter is transmitted to an ACMM.

BRAZIL

INPE Lets Contracts for Satellites

91SM0400A Sao Paulo GAZETA MERCANTIL
in Portuguese 27 Jun 91 p 13

[Article by Sao Jose de Campos correspondent Carlos Lovizzaro]

[Text] The National Institute of Space Research (INPE) last week signed contracts worth \$9.9 million with Brazilian firms to build the most sensitive components of the two optical sensing satellites under the Brazilian Complete Space Mission (MECB).

"After a year of postponements, we have completed the orders intended to be placed with private enterprise, which total \$13 million," said Carlos Eduardo Santana, the electronic engineer responsible for INPE's data collection satellite project. According to Santana, \$4.5 million is guaranteed under this year's budget.

The engineering prototype for testing should be ready at the end of 1993. "That way, we will be able to conduct all the tests and correct any design errors in the project," Santana emphasized. Launch is scheduled for 1995, aboard a Brazilian rocket being developed by the Aerospace Technical Center (CTA).

The main contract, for \$9 million, was let to Esca Engenharia Sistemas de Controle de Automacao, S.A., of Sao Paulo, which will develop the imaging instruments—an optical-electronic assembly that captures the images of the earth's surface and transmits the signals to a base here in Brazil.

The imaging assembly consists of a camera, signal processor, transmitter, and antenna. Esca's role, according to Pedro Cury, its marketing director, "will be to evaluate the feasibility of the project developed by INPE, order the different components from Brazilian suppliers, and put the final assembly together."

Esca will be assisted in its work by consultants from the French firm of Matra. "The most difficult part of the project is to develop the camera," Cury acknowledged. The system is able to capture images of the earth's surface in strips 900 km wide and identify geographic features or buildings with a lateral spatial resolution of 260 meters.

In all Esca, will have to deliver nine imaging systems and three test devices to INPE—the first unit within 14 months, and the last within 30 months. Four imaging systems and one test device will be used in the MECB data collecting satellite while the others are earmarked for the China-Brazilian earth resources satellite (CBERS).

This joint program between the two countries calls for two satellites, to be launched, using the "Long March" rocket, in 1993 and 1995. "Unfortunately, except for this

contract with Esca, we do not yet have funds for contracting with suppliers for the CBERS," said INPE's Santana.

Another company chosen as supplier of the MECB data collection satellite was Elebra Sistemas de Defesa Ltda., a Sao Paulo firm controlled by Elebra Eletronica, part of the Docas Group. It will get \$900,000 to develop four units of an electronic device known as a telecommand decoder, which receives messages from Earth and transmits the commands to the other equipment on board the satellite.

Omar Gattas, a director of Elebra Sistemas de Defesa Ltda., says that the company is very interested in the Brazilian space program. "We won the competition to produce four pieces of equipment for the CBERS mission that are worth \$3.1 million, but the contracts have not been signed yet owing to lack of funds," he said.

Five other companies had already received orders associated with the INPE data collection satellite. Aeroeletronica, of Porto Alegre, received \$100,000 to produce a prototype of the electric power controller on board the satellite in August 1992. Digicon, also from Rio Grande do Sul State, has been given \$260,000 to deliver the solar panels in January 1992. Industrias Nucleares Brasileiras won \$160,000 to make the cases for the on-board equipment by next September. Copesp [Special Projects Coordinating Board], a foundation associated with IPEN [Institute for Nuclear and Energy Research], has \$140,000 to machine the satellite rockets, to be done by this October. Finally, Composite, of Sao Jose dos Campos, will get \$2.6 million to deliver the metal structure, made of composite materials, by June of 1993.

Shortage of Materials and Know-How

The Brazilian space program has ambitious objectives but suffers from a shortage of funds and technology. Under the MECB, a Brazilian rocket was to be used to launch a Brazilian satellite two years ago.

The satellite developed by INPE was ready on time, but the launcher designed by the CTA never got off the drawing board.

That is why the Brazilian Commission for Space Activities (COBAE) solicited international bids to determine who would supply the launch vehicle. The results will be announced shortly.

There are two types of satellites under the MECB: the first two are to be used to retransmit environmental data that is collected on the ground by automated platforms distributed all over Brazil. The last two will perform remote optical sensing of Brazilian territory. Brazil signed a commitment with China to build and launch two remote sensing satellites that will weigh 1.4 tons each. These satellites are supposed to be launched in 1993 and 1995, using the Chinese rocket known as

"Long March," but the federal government has released only one tenth of the \$20 million scheduled to be made available this year.

COLOMBIA

Telecom To Improve Telephone System

91WT0163A Bogota EL ESPECTADOR in Spanish
17 Jul 91 pp 1B, 4B

[Article by Rosario Herrera]

[Text] Bogota—Soon Colombians who live in the areas bordering Ecuador, Venezuela, and Peru will be able to make phone calls to those countries at special rates, lower than the so-called "international" rates they pay today.

At present, these calls cost the same as those made from the interior of Colombia to any city in Venezuela, Ecuador, or Peru.

The National Enterprise for Telecommunications (Telecom), in keeping with the desire for integration expressed by the countries that make up the Andean Pact (Colombia, Ecuador, Venezuela, Peru, and Bolivia), has begun talks with the phone companies of each of these nations with a view to making substantial reductions in the rates for connecting border towns.

The president of Telecom, Francisco Javier Navarro, explained that pacts have already been signed for this purpose with Venezuela and Ecuador, and progress is being made on a similar agreement with Peru. For the specific purpose of aiding communications in the border regions of this country, the company has just purchased the equipment necessary to establish a telephone link between Leticia, Colombia, and Caballococha, Peru.

Although the initial goal is to reach agreements on rates with the Andean Pact nations bordering Colombia, Telecom hopes to hold talks and sign similar accords with the phone companies of Brazil and Panama in 1992.

This effort by the National Enterprise for Telecommunications is one of many aimed at achieving the administration's goals for the 1991-1995 period. Other major goals are the expansion of national telephone lines, the improvement of international satellite communications, and a link-up to a new underwater fiber-optic cable that will make it possible to expand communication channels

to the United States, to establish a connection with Mexico, and to route calls directly to Europe.

Lines, Exchanges, and Satellite

Between 1991 and 1995, Telecom will continue to execute several plans to expand and improve communication circuits. This project, at a cost of about 130 billion pesos, is distributed as follows:

- Expansion of telephone exchanges in Ibague, Popayan, Santa Marta, and Cienaga.
- Expansion of Valledupar exchange and installation of remote module in Bosconia.
- Digitalization of microwave trunk network, replacing analog junctions with digital ones.
- Digitalization of microwave section between La Guajira and Santa Marta.
- Installation of 100,000 telephone lines in the departments of Meta, Huila, Tolima, and Valle.
- Transmission to provide outlet for expansions of local exchanges in the Sabana, Atlantic, and Boyaca Plans.
- Improvement of the satellite transmission network between Choconta and Leticia, to expand communication in the National Territories.

All of these areas of operation will be complemented by the digitalization of the microwave network between Bogota and Choconta, which is part of the effort to modernize national and international communications to take maximum advantage of the Intelsat satellite transponder that Colombia uses for its link-ups.

At present, this microwave network operates under an analog system. When it is digitalized, the network's transmission capacity can be enhanced and satellite transmissions will be improved.

As part of this project, Telecom will install equipment designed to digitalize the signal that is sent from the company's ground stations in Choconta to the telecommunications satellite. In this way, the signal will be of better quality and there will be less interference.

The president of Telecom, Francisco Javier Navarro Velez, indicated that although this project will increase the country's international connection capacity, "at present we have a larger segment than the country is using, and with the equipment we are going to install in Choconta to digitize the signal, two or three years will go by before we will need additional space capacity."

INDIA

Communications Minister Talks to Press

91WD1070A Bombay THE TIMES OF INDIA
in English 9 Jul 91 p 13

[Text] New Delhi, 8 July—Is Mr. Sam Pitroda, chairman Telecom Commission, mellowing and becoming more flexible on some of his past ideological stance? More important, has he decided to work in harmony with his minister even when appearing to be overruled? These are some of the questions which have gained prominence after the first press conference addressed by Mr. Rajesh Pilot, the new communications minister, here today.

In his speech, Mr. Pilot announced a few radical decisions which, in the past, had been opposed by Mr. Pitroda. Even Mr. Pitroda, who was present at the press conference, relaxed a bit on the controversial issue of whether the country should opt for Alcatel technology or that of C-DoT for the country's future requirement.

Replying to a question on the choice of switching technologies for the expansion of the telecom network, the minister said that his ministry will have an open mind and accept a better option if it was available.

Surprisingly, just before this, Mr. Pitroda had stated that Alcatel's E-10 and C-DoT will be the two predominant technologies which will serve the switching equipment requirement of the country till the turn of the century. This itself is a distinct turnaround from Mr. Pitroda's earlier stand as he has repeatedly stated that only C-DoT technology will be the basis for telecom expansion.

Mr. Pilot, in a surprising move, said that car telephones will be offered to customers on a first-come first-served basis at a high premium in foreign exchange. The import of car telephones had been opposed by Mr. Pitroda who had wanted it to be developed indigenously.

The minister now feels that there has been an increasing demand for car telephones and the telecom department proposes to allow imports in consultation with the finance ministry. "The high premium on this service will enable the department to generate surplus revenue which could be utilised for provision of public telephones in resettlement colonies, low-income group housing societies and others," Mr. Pilot explained.

The minister stated that a high power committee report—obviously referring to the Athreya Committee—on the organisational structure of telecom in India will be examined with an open mind and a decision in the best interests of the subscribers and telecom department will be taken.

This will obviously mean that the minister will take a fresh look at the expansion of Mahanagar Telephone Nigam Ltd., which has been dealt with in details in the report. The report has recommended that MTNL be renamed "India telecom operating corporation" as a holding company which will "carry the autonomy and

accountability for the performance of the government operated field telecom services."

In an obvious attempt to placate the business community as well as bulk users like banks and airlines, the minister said that they will be given permission at appropriate rates to build and operate their own network connected to public network. This permission had been denied till now as the department feared loss of revenue.

Mr. Pilot also made a host of promises to improve the telecom network in the country. He promised that the employees of the department will be trained "to bring about a discernable behavioural change." Adding that preventive maintenance programmes will be accorded highest priority to reduce the fault rate to a bare minimum.

He said that the number of working lines will be increased to 100 lakh by the end of the Eighth Plan and to 200 lakh by the end of the century. At present, their number is 51.26 lakh. The sum of Rs 20,000 crores required for the purpose will be raised mainly through internal resources and financing through bonds, leasing and private sector participation.

On the question of long waiting list for telephone connections, Mr. Pilot said that they would gradually work towards reducing the period to six months. To start with, those registered under the OYT (own your telephone) category in Delhi and Bombay till June '91 will be provided connections by December '91.

Laying special emphasis on the improvement of rural telecommunications services, he said that by March 1995 all 220,000 panchayat-level villages in the country will have long distance public telephone facility. This facility is at present available only in 30,213 villages. He also promised that the process of connecting all district headquarters in the country through STD facility will be completed by March 1992.

Weather Data Received Direct From INSAT-1D

91WD1069A Bombay THE TIMES OF INDIA
in English 19 Jul 91 p 5

[Text] Bombay, 18 July—The nearly 150-year-old meteorological office at Colaba started receiving data directly from the INSAT-1D (Indian National Satellite System) a month and a half ago.

Earlier, the data was acquired from the satellite at the meteorological data utilisation centres in New Delhi and transmitted to various centres through communication links provided by the department of telecommunications.

As a result, the quality of the pictures, which were cloud imageries, left much to be desired as there was a loss of signals.

Now, the quality of the cloud pictures is sharper thereby helping the staff to interpret them and provide more precise forecasts.

The deputy director-general of the India meteorological department, Dr. S. Kumar, while explaining how the system worked said there were two television transponders on the INSAT-1D utilised for operating a TV service. The portion which has not been utilised is being used for meteorological services.

He said that the signal from INSAT-1D is first received by the New Delhi centre. The cloud picture is then processed, relayed back to satellite which is in geostationary orbit at 36,000 km. It is then retransmitted to the various meteorological centres throughout the country. The new scheme is referred to as the Meteorological Data Dissemination (MDD).

The Colaba office received data from the satellite every three hours. The receiving equipment is manufactured by National Information Technology Limited, a public sector company, and was designed and developed by the space applications centre of the Indian Space Research Organisation.

The Colaba office has been receiving data from the INSAT-1A, INSAT-1B and INSAT-1C signals, but these were transmitted from the meteorological data utilisation centre in New Delhi.

What makes the current project unique therefore, is that it is the first time in its history that the office has started receiving data directly from the INSAT-1D after being processed at New Delhi according to Dr. S. Kumar.

Television Centers To Counter Pakistan Broadcasts

91WD1071A Madras *INDIAN EXPRESS* in English
8 Jul 91 p 1

[Text] Jaipur, 7 July (UNI)—Union Minister of State for information and broadcasting Ajit Panja announced on Sunday that three high power TV relay centres—two in border districts—would be set up in Rajasthan to counter the popularity of Pakistan TV programmes.

In an informational chat with newsmen here, Mr. Panja said a ten kw high power TV relay centre at a cost of about Rs 9.3 crore would be installed in Barmer and another 10 kw high power TV relay centre at a cost of Rs 6.5 crore at Jaisalmer—both border districts of Rajasthan.

Purpose of Jalna Giant Dish Antenna Told

91WD1043A Bombay *THE TIMES OF INDIA*
in English 12 Jul 91 p 3

[Text] New Delhi, 11 July—The 14-metre giant dish antenna proposed to be set up in Jalna, Maharashtra, will monitor the strength of signals over Indian air space for the telecommunications department.

The dish was being manufactured by the department of space for the wireless planning and coordinating committee of the telecommunication department and not for the information and broadcasting ministry. The I and B secretary, Mr. Mahesh Prasad, clarified that the ministry had nothing to do with the Jalna facility and there was no question of the ministry trying to jam incoming signals from foreign television stations or radio broadcasts.

Since the government was aware of the variety of television programmes that will be available to Indian viewers, thanks to satellite facilities, that the ministry has decided to open up television in India to public corporations and improve the quality of Doordarshan's own programmes, Mr. Prasad said. The 'C' bank facility at Jalna is for fixed satellite mode transmissions and not for broadcast mode transmissions.

Satellite Data Communication for Airports

91WD1044A Madras *THE HINDU* in English
11 Jul 91 p 3

[Text] Madras, 10 July—The National Airports Authority (NAA) has plans to introduce satellite technology for data communication at 51 airports in the country to help improve the Aeronautical Fixed Telecommunication Network (AFTN) systems from one airport to another.

Inaugurating a three-day International Civil Aviation Organisation (ICAO) Coordination Meeting in the city here today, the NAA Chairman, Air Marshal C.K.S. Raje, said that the country was indeed lucky to have its own satellite which was being put to use for conducting scientific experiments and establishing links with remote places.

The NAA Chairman said the organisation was preparing itself to meet the unpredictable air traffic growth projected by various agencies before 2,000 A.D.

The main objective of this ICAO meeting being held for the first time in Madras, was to identify communication deficiencies experienced in the country.

New equipment would be installed at NAA's Civil Aviation Technical College in Allahabad to help enhance the training facilities in the various facets of aeronautical communication and radio navigational systems functioning at the airports.

Mr. Paul K. Fenelly, ICAO Project Coordinator, Asia and Pacific Region, New Delhi, said the ICAO's Regional Office would initiate follow-up action and effectively monitor the implementation of the recommendations chalked out at this meeting.

Primary objective: Mr. K.P. Rimal, ICAO representative in Bangkok, said the primary objective of this meeting was to discuss and coordinate matters relating to the improvement of Aeronautical Flight Service and communications systems in Bombay, Colombo, Kathmandu, Madras, Male.

Mr. K. Ramalingam, Regional Coordinating Director, NAA Madras, welcoming the gathering, said the delegates to the meeting sponsored by the ICAO were from the Maldives, Nepal, Sri Lanka, Indonesia and India.

Mr. L.R. Garg, Director of Communication (Operations), NAA, New Delhi, proposed a vote of thanks.

Country's First UHF Communication Network

91WD1000A Madras THE HINDU in English 3 Jul 91
p 7

[Text] New Delhi, 2 Jul—Steel Authority of India Ltd., has introduced ultra high frequency radio communication network to interlink its captive mines located all over eastern India and the raw materials division in Calcutta.

The system being tried for the first time in the country in the demand assigned mode will ensure faster communication of both voice and data, according to a SAIL press release.

The operation of the network was witnessed by the SAIL Chairman, Mr. S.R. Jain, Secretary Electronics, Mr. N. Vittal and senior officials, at Ispat Bhavan here yesterday.

Plans for Launching of Insat-2 Told

91WD0928A New Delhi PATRIOT in English 9 Jun 91
p 6

[Text] Bangalore, June 8 (UNI)—Indian national Satellite System-two (INSAT-II) will be launched wither in December-January next, Space Commission Chairman Prof U.R. Rao said today.

Delivering the foundation day lecture on "Space communications in the coming decade" here, he said, the INSAT-II system would be bigger than to the INSAT-system and far better in terms of design and solar array deployment systems.

The satellite would have 18 transponders and would work on C-band, the technology used elsewhere in the world.

The geo-stationary satellite, would have a seven-year life span and was expected to provide facilities for telecommunications, television coverage, radio networking, meteorological observations and disaster warning, besides satellite aided search and rescue, he said.

Tracing the growth of space technology in the country Prof Rao said the space programs had "revolutionized" development beyond limits. There had been sustained efforts to improve communication services using the satellite like ups.

He said India had many "firsts" to its credit and Satellite Instructional Television Experiment (SITE) was one such program which was by and large successful in educating the rural masses.

SITE had paved the way for a new communication role in the world. Gramsat was also used for eradicating illiteracy in rural areas, he said.

He said though the "green revolution" had yielded good results, it had its own disadvantages such as inadequate drainage system and indiscriminate use of fertilizers. Hence to ensure optimum utilization of available water resources and soil management there was a need to educate the rural people.

Prof Rao said personalized and mobile communications were two new areas which would soon become a reality. There was a stress on increasing rural terminals to ensure effective service of the satellite in those areas, he added.

He said flood-hit Bangladesh could use the services of Indian satellite as suggested by Prime Minister Chandra Shekhar during his visit to the flood-hit areas recently.

On the growth of television, he said 550 stations covered 65 percent of the geographical area and reached 75 percent of the population.

Policy on Rural Telecommunications Told

91WD0927A Calcutta THE TELEGRAPH in English
29 May 91 p 8

[Article by K.K. Sharma]

[Text] New Delhi, May 28: The existing policy of the government for extending telecom facilities to the rural areas is to provide at least one telephone, without considering profit or loss, for every hexagonal area of five km. The whole country has 48,888 hexagons, of which 32,574 have so far been covered.

Considering that there are about 2.21 lakhs of panchayats in the country, the government has decided to bring all the panchayats into the telecommunication network by using modern transmission media, like radio systems, PCM systems, etc. It has also proposed small size telephone exchanges of up to 16 lines at the lower end so that people could enjoy telephone facilities even in smaller places. These programs are expected to bring rural areas in remote villages into the national telecom network.

The draft Eighth Plan objectives envisage provision of public call offices in all the ram panchayats. During the period, 15,000 public call offices will be installed in rural areas, vastly in gram panchayats.

The rural component of the draft Plan provides for 10.6 lakh additional lines of switching capacity and public call offices in all gram panchayats. It is also planned to give telephones practically on demand in rural areas. There is a proposal to cover all the villages by AD 2,000 at an estimated cost of Rs 3,000 crores.

All the panchayats are proposed to be provided with public call offices by 1995 and every village will be provided with public call offices by AD 2000.

The government perspective plans are to meet the future demand of exchange equipment with indigenous products. There will be continuous upgradation of technology to make the equipment suitable to meet the growing requirement, traffic conditions and new devices as well as technology advances.

Production capacities are being created with indigenous technology both in the case of small and large capacity exchanges. New initiatives, like identification of significant factors, contributions to costs and reducing costs with the optimal utilization of available resources are also envisaged.

IRAN

Iran To Expand Telecommunications

NC0807182891 Tehran KEYHAN in Persian 25 Jun 91
p 3

[Text] Bumehen, 24 Jun—The second earth station for international satellite communications at Bumehen will become operational by the month of Shahrivar [23 August—22 September] with the efforts of specialists at the Telecommunications Company of Iran [TCI]. Through this station, our compatriots will be provided with greater facilities for international communications.

Engineer Kamran Majdmanesh, director for satellite communications at the company, announced this during a visit by KEYHAN directors, managers, and other staff to the satellite communications earth station at Bumehen.

Mr. Seyyed Mohammad Asghari, manager of the KEYHAN complex; Hava'i, representative from the KEYHAN weekly; and officials from the administrative and public relations departments at the KEYHAN complex were among the visitors. They got a glimpse from this station of the Inmarsat coastal station and the second earth station for international satellite communications, which is being installed.

Mr. Shahabeddin, deputy minister for telecommunications in the Ministry of Post, Telegraph and Telephones; Engineer Kamran Majdmanesh, director for satellite communications at TCI; Engineer Qazi, deputy for operations and maintenance for satellite communications; and Mr. Motahherinezhad, director general for public relations at the Ministry of Post, Telegraph and Telephones, also were present. Telecommunications officials and experts answered questions from the visitors and explained the latest satellite technology used internationally and the amount of progress made on the Islamic Republic of Iran's Zohreh satellite.

In conclusion of this visit, Engineer Majdmanesh in an exclusive discussion answered questions regarding the plan under implementation at the Bumehen center, the expansion of the satellite earth station, the stages for

implementing the plan for the Zohreh satellite, and the rumors that U.S. and European television will be relayed by satellite to Iran.

He first referred to the coastal satellite center in Bumehen, which he said will start operating by the month of Shahrivar this year and said: With the Inmarsat coastal station becoming operational, ship-to-shore and air-to-shore contacts will be possible. The country's transportation network also will be covered by satellite communications.

Engineer Majdmanesh announced that seven earth stations are being installed in Tehran, Esfahan, Kerman, Bandar 'Abbas, Zahedan, Sanandaj, and Bushehr and added: These stations, which will enable contact with 54 parts of the country, will begin operating by the month of Dey [22 December—20 January].

He added: We are inviting tenders for the equipping of 17 other provinces in the country with satellite earth stations, which will facilitate communications between more than 300 parts of the country, and the installation of these stations will begin during the second half of next year.

The director for satellite communications at TCI referred to the fact that at present, because of the three earth satellite stations at Asadabad Hamadan, Esfahan and Bumehen, the Islamic Republic of Iran has more than 1,300 communications channels, and through Intelsat, Iran has links with 39 countries. He said: Based on what has been planned, the country's international communications channels will increase to 5,000 during the next three years.

He then mentioned the establishment of communications services in the country's banks through earth satellite stations, including fast access services by TCI. He said: The links among the country's information banks will be provided by 200 local earth stations. The work for purchasing the aforementioned stations has been completed and soon they will be transported to the country. The plan for the indigenous construction of these stations, in collaboration with the research center at TCI, is in the process of implementation so that in the future we will not have to import them.

Regarding Iran's independent Zohreh satellite, Engineer Majdmanesh said: The plan for constructing the Zohreh satellite has been laid open for international tenders, and at present we are considering bids from European countries.

He added: During the next two months, the best and most suitable manufacturer for the satellite will be selected, following which the stages for manufacturing the satellite—which will continue for three to five years—will be initiated, and it will be launched in the year 1374 [year beginning 21 March 1995] and become operational.

The director for satellite communications at TCI referred to the services the satellite can provide, such as swift telecommunications links with the deprived, far-flung areas of the country; a reliable service for our military and law enforcement forces; creation of immediate links with border forces for surveillance and to prevent drug smuggling; the expansion of radio and television programs' coverage area across the country; and the establishment of a communications network for the national mass media.

He added: With the operation of the satellite and with the installation of its earth stations in various parts of the country, it will be possible to simultaneously transmit educational programs for various levels (elementary, secondary, high school level and university levels) all over the country, including programs on agriculture and literacy, the establishment of links between the specialized medical centers, and the treatment centers in most parts of the country, for the purpose of medical education, prevention of common diseases and the treatment of patients by local doctors. By means of the satellite, in addition to links between meteorological stations with the centers for forecasting the weather in Tehran, it will become possible for the country's officials to convene meetings in the far-flung areas and have audiovisual links with the relevant officials in all parts of the country.

He then commented on the rumors of the receiving of American and European television programs in Iran by satellite, saying: On principle, every country needs to have a legitimate license from the International Telecommunication Union (ITU) in order to have a satellite and to launch it into space. ITU elicits the approval of all member countries as well, and then the applicant country can send its satellite into a specified orbit. Therefore the possibility of launching a satellite over our country's space by Western countries is not possible within the framework of the corpus of international laws and regulations.

He added: The supposition that this can be done clandestinely also is fallacious, as the period for planning a satellite until it becomes operational is at least five years. During this time many countries can become aware of such a matter and will protest against any illegitimate action. We have not witnessed any signs of such a situation.

Engineer Majdmanesh continued: If we assume that the United States is planning a satellite for Europe and that by changing its direction toward Iran it wishes to cover our country, first it will not be feasible from the economic point of view, as it will require a minimum investment of \$100 million for covering Europe, which will not be worth it, and second, once again the issue of violating international regulations arises.

He added: In addition to the satellite coverage of Iran being illegal, it will not be easy even from the technical point of view, as the reception of satellite pictures on a normal television set is not something which can be done

easily by an antenna, and only a special receiving apparatus can receive the above pictures.

In conclusion, when asked if in the future it becomes possible to receive television pictures in Iran by satellite if there is a way to neutralise this, he replied: In such a case there is a way of tackling foreign satellites, such as transmitting static on the same frequency as the one on which the television programs are being transmitted, thus distorting the reception.

Progress of Radio Station Construction

LD1007184191 Tehran IRIB Television First Program Network in Persian 1630 GMT 10 Jul 91

[Excerpts] Mr. Mohammed Hashemi, managing director of the organization of the Voice and Vision [radio and television] of the Islamic Republic of Iran, inspected the construction and installation work of the powerful short-wave and medium-wave radio transmitters for foreign broadcasting in Sirjan. Please listen to the report of one of our colleagues from Kerman center regarding this visit:

[Reporter] [passage omitted] During this visit, in providing the necessary explanation about the progress of work, it was stated that the medium-wave transmitter or Sirjan has one 257-meter antenna, one 400 kilowatt [kw] and one 150 kw transmitters, and one 100 kw reserve transmitter. At the moment, 70 percent of the construction work of the station and 30 percent of the installation work has been completed; and they are due to be commissioned by the end of the year 71 [year 71 starts on 21 March 1992].

It should be added that the first phase of the short-wave radio transmitter station of Sirjan for foreign broadcasting, which is being installed on a 1,800 hectare site, consists of 10 500 kw short-wave transmitters purchased from Germany, which will be installed after the completion of the construction work. The second phase of the project also consists of six 500 kw transmitters which will be installed in the main transmission hall after the completion of the first phase. This radio center, with 48 antennas and one antenna rotator, will be able to transmit to all parts of the world. [passage omitted] In order to provide emergency power for the short-wave transmitter station, a 15 megawatt power station will be built.

Communications Center To Operate in Hamadan

91AS1067Y Tehran ABRAR in Persian 9 May 91 p 9

[Text] In order to improve long distance communications, the second "S.T.D." [Subscriber Toll Dialing] digital communications center in the country will begin operation in Hamadan this year.

The director general of communications of Hamadan Province announced in a press conference: With the operation of this large project, the long-distance communications will improve by 50 percent in this province.

According to IRNA, he mentioned that the final capacity of this digital center is 3,360 channels and said: A center similar to this is at the present only in operation in Tehran.

Speaking about the coming World Communications Day (22 Ordibehesht [12 May]), he added: The most important task of this center is to facilitate coding.

In continuation, the director general of communications in Hamadan described the programs of this office in 1370 [21 March 1991-20 March 1992] and said: This year, with estimated funds of 10 billion rials, a total of 103 construction projects for creating communication centers in rural and urban areas will be carried out.

He mentioned the total number of telephones operating in Hamadan Province at the present time to be 46,680 and projected that with the operation of the new center, by 1371 [21 March 1992-20 March 1993], more than 20,000 other telephones will be added to the existing number.

He pointed out: Last year, a total of 5 billion rials from the national funds were spent on communications projects throughout Hamadan Province.

In conclusion, this official pointed out: Also, in 1369 [21 March 1990-20 March 1991], 7,730 telephones were given to applicants who met the requirements in the cities and villages of this province.

'Zohreh' Satellite To Be Launched in 1995

91AS1285H London KEYHAN in Persian 18 Jul 91 p 4

[Text] The communications company of the Islamic Republic is trying to expand its international communications network by launching a communications satellite into space. This satellite has been named Zohreh, and according to Kamran Majdmanesh, the manufacturing design for it has been put up for international bidding. Engineer Majdmanesh, who is director of the satellite communications affairs of the communications company, said to reporters: At the present time, this company is studying the proposals made by several European countries to build the satellite. This official announced that in the next two months the best and most suitable manufacturer of the satellite will be chosen. He added: "After the manufacturing phases, which will take 3.5 years, this satellite will be launched into space in 1374 [1995] and put into operation." The director of satellite communications of the communications company said: "Through the satellite, rapid communications to remote places will be made possible. Moreover, secure services will also be offered to the military and security forces." The official mentioned that this satellite will be mainly used to expand educational, medical, agricultural and meteorological services.

ISRAEL

BBC TV Broadcasts Now Available by Satellite

Tel Aviv 'AL HAMISHMAR in Hebrew 19 Jul 91 p 6

[Report by Vered Levi]

[Text] BBC TV broadcasts can now be received in Israel by satellite. To receive these broadcasts, it is necessary to have a special dish costing between 10,000 and 20,000 shekels and a special decoder which costs approximately 2,000 shekels.

DENMARK

GN Store Nord Emerging as European Force

Heads GSM Syndicate

91WT0150A Copenhagen BERLINGSKE TIDENDE
in Danish 24 Jun 91 P II 3

[Article by Lars Johansen: "Tietgen's Spirit Inspires GN Store Nord"—first paragraph is BERLINGSKE TIDENDE introduction]

[Text] A syndicate with GN Store Nord at the head ran away with the bid for the new mobile telephone net, GSM-Net. On the stock market the company's stock rose, not so much because the company will earn a huge profit from the agreement, but because people now know what the company intends to do.

Back to Basics

After having tried various enterprises in the past 15 years, GN Store Nord, with its headquarters in Kongens Nytorv in Copenhagen, is now turning back to the old basic idea, namely telecommunications. This was recently confirmed at the beginning of this month when a syndicate with GN Store Nord at the head won a bid for construction of the new mobile telephone, GSM-Net. In April of this year the company also became involved in a cable project in Poland.

On Copenhagen's stock market the company's stock shot up in unusually heavy trading. Even though the income potential was not just around the corner, the stock rose no less than 15 percent after the announcement of the GSM agreement.

Nor was it the immediate profit that created great desire to invest in the company. No, in financial circles there has for some time been doubt about where GN Store Nord was going. After the agreement with GSM, the direction has become clear.

Thomas Fr. Duer, the managing director of GN Store Nord, said: "In large individual projects, it will be the telegraph company that will characterize GN Store Nord, but we are at the same time very interested in seeking growth within the industrial sector."

For GN Store Nord is definitely much more than telecommunications, and there is no doubt that C.F. Tietgen would rub his eyes if he could see what his old darling has become in the past 15 years. The visionary Fyn native, who in 1869 saw the significance of the development of the telegraph and formed Den Store Nordiske Telegraf company, had not thought that the telegraph company would also encompass hearing aids, batteries, and measuring instruments—not to speak of what Store Nord attempted without much luck.

Electronic data processing, outlets, electric installations, and wholesale operations were all activities that—after significant losses—were dropped.

From the middle of the 1970's, the company consciously began to diversify because the traditional telegraph market began to stagnate, and earnings were hit. Duer said about this: "After the Second World War there was in most countries a tendency for the state to run telecommunications as a monopoly, but now the world has changed, and in the liberalization process the private companies are entering the picture again."

The concessions for cable operations in the North Atlantic were simply not renewed, and if the company was to survive, it had to find new pastures.

The significant diversification into other activities has meant that Tietgen's old telegraph company only forms a minimal part of the company's total activity. In fiscal year 1990, the company's old center had a turnover of only 9.3 million kroner and produced a profit of 1.4 million kroner. This is in sharp contrast to the beginning of the 1980's, when telecommunications, even as late as 1983, made up the company's most important source of income.

But the industrial activities have in no way been a bed of roses. The subsidiaries simply do not earn enough. Stock analysts also point to the poor development in the primary operation as one of the company's weaknesses. Each time the company has a turnover of one krone, there are only about three ore left after the costs have been removed. In the 1989 balance there were four ore left from every krone turned over.

Honor Intact

"Earnings in our industrial companies are unsatisfactory. We are therefore trying hard to improve the primary source of income," Duer said.

GN Elmi, which produces measuring instruments, has seen a severe fall in income. In recent years, GN Elmi has provided a significant part of the company's primary income.

"Elmi has invested a lot in development, and we have charged this directly to the operation. We are taking the whole beating at once," Duer explained.

The company emerged from 1990 with its "honor intact." Ordinary operations showed progress, and there were large extraordinary earnings that came mainly from the sale of the subsidiary GN Laur. Knudsen to NKT in the spring of 1990.

The sale of GN Laur. Knudsen meant that earnings increased greatly, and this was also the source of the company's significant net financial income that moved the ordinary operation in the right direction.

The poor profits have caused criticism of the company's structure. The reciprocal connections could be clearer, the critics say. It's a little like a messy store. But Duer says of the future: "The main structure that we have today is the one that will continue."

Capital Commitment

After the sale of GN Laur. Knudsen, the thinking was big. GN Store Nord could be broken up. This caused doubt about the company's strategy for the future, and it was mainly in the light of a clearer course that the stock rose so sharply in the wake of the GSM agreement.

The investments in GSM-Net and in other large projects, particularly in East Europe, will provide a large commitment of GN Store Nord's resources. GSM-Net alone will require a total investment of about a billion kroner. This capital commitment will reduce the company's liquidity and its financial surplus. This will improve the primary operation considerably if the ordinary operation is to remain unchanged. The primary operational surplus must be approximately doubled if the company is to meet the expectations of an unchanged ordinary operational result.

The significant investments will not be made this year, according to Duer. But there are many large individual projects—there is always a certain risk that they will develop problems.

But the good news is that when the "shit" stops, there will be a very nice profit. Experience shows this.

Hopes for USSR Cable Job

91WT0150B Copenhagen BERLINGSKE TIDENDE
in Danish 1 Jul 91 p II 2

[Text] With an increased relaxation of tension in the world, Danish firms will be able to lay telecommunications cable right over the Soviet Union.

An international syndicate, TSL-Syndicate, with Danish participation, has provisionally received permission to lay a fiber optic cable from Denmark to the Soviet coast at Leningrad. From there the connection will continue as a radio chain to Moscow. Cocom, the Western organization that controls the export of technology to the Soviet Union, prohibits the extension of the cable through the Soviet Union. The Danish partners in the TSL-Syndicate are GN Store Nord and Telecom (formerly the State Telephone Service).

BERLINGSKE TIDENDE reported Saturday June 29 on an article from FINANCIAL TIMES, according to which NKT and not GN Store Nord was in the syndicate. This information is incorrect.

"Today there are 30 connections from Denmark to the Soviet Union, but with the new connection we will go up to 2,000," GN Store Nord's managing director, Thomas Frederik Duer, said.

"We will now seek permission to lay fiber optic cable from Japan and South Korea to Vladivostok or Nahodka in Siberia. Later we hope to obtain permission to lay a fiber optic cable through the Soviet Union from Leningrad to Siberia," he said.

Telecom First User of New Computer Service

91WT0158B Copenhagen BERLINGSKE TIDENDE
in Danish 17 Jul 91 p II 7

[Unattributed article: "Intelligent Telecommunications Information"]

[Text] The Danish firm of Telecom Service, Inc. has now emerged on the world market as the first user of a new computer-based system to handle inquiries for international telephone numbers. Each year Telecom, Inc. handles 600,000 foreign telephone conversations and answers approximately two millions inquiries for international numbers.

NKT Firm Finds SDH Sales Success

91WT0158A Copenhagen BERLINGSKE TIDENDE
in Danish 24 Jul 91 p II 2

[Article by Uffe Gardel: "Danish Electronics in Norwegian Telephones"—first two paragraphs are BERLINGSKE TIDENDE introduction]

[Text] The Danish firm of NKT has won the contract for electronic equipment for the Norwegian Televerket out from under the nose of some of the world's biggest [suppliers].

Development costs are so great that only a few of the world's electronics firms can manufacture the equipment NKT will sell to Norway.

It will be Danish-built electronics which will carry telephone traffic in Norway in the future. Indeed the Norwegian Televerket has chosen the Danish firm NKT as its main supplier of new equipment for the high-speed transmission of telephone conversations and other telecommunications traffic such as data transmission and cable television.

"We're talking about a three-year framework agreement under the terms of which the Norwegians have not obligated themselves to purchase a certain quantity, but we expect a sale on the order of 50 million kroner," said Poul Friis, NKT's division director.

The new high-speed equipment will get its baptism of fire at the Winter Olympic Games, which in 1994 will be held in Norway.

Danish Firm Competes With Giants for Electronics Orders

For the time being, the Norwegian contract is a victory for the Danish firm of NKT in the tight competition with the world's big electronics firms.

Over the next three years, from 1992 to 1994, NKT has been chosen as one of the main suppliers of equipment for high-speed data transmission to the Norwegian telecommunications company Televerket. As always with larger telecommunications orders, Televerket has chosen more than one supplier.

The competition over the new equipment is tight. It is expected that most of the world's telecommunications companies will convert to SDH equipment in the coming years, and for electronics producers it is a case of rapidly gaining visibility by winning the first orders. In Europe thus far only Germany and Norway have chosen suppliers, and in both cases NKT was number one. In Denmark the first order is expected to be put out for bids sometime in the fall, according to Poul Friis, NKT's division director.

"There are only four to five firms in the world that can do this," said Poul Friis, mentioning companies such as Siemens, Alcatel, Nokia, L.M. Ericsson, AT&T, and Philips.

The reason for this is clear enough—SDH technology costs huge sums in research and development.

Development: 500 Million Kroner

"The overall cost of developing a complete system with SDH equipment will run in the neighborhood of 500 million kroner over the next six to seven years," said Poul Friis. Of that amount NKT has thus far spent "a large two-figure amount in the millions," he said. Among other reasons, the major development costs have caused Alcatel and Philips to enter into cooperation on SDH equipment. "Nor would I exclude the possibility that we could work with one or two other producers for certain parts of the equipment to save development costs," said Poul Friis.

SDH—Rapid Electronic Talk

The Danish firm NKT is one of the few in the world which supplies SDH electronics. SDH is the world's fastest technology to transmit data via cables.

The electronic equipment—so-called line terminals and regenerators—sit at each end of a light guide, and it is the electronics which decides how many telephone conversations the cable can carry. Electronics converts ordinary speech, computer signals, and television pictures into digital flashes which are sent via the light guide. At the other end the light signals are reconverted into what they were originally.

With SDH electronics, each fiber in a light guide can transmit data equivalent to 30,000 telephone conversations at a time. The technology which has been used to date can carry a mere 8,000 conversations at a time, though that is four times as many as the first light guide technology in the 1980's.

SDH stands for Synchronous Digital Hierarchy. The first word in the name refers to the fact that the equipment always operates on the same frequency. The advantage to this is that terminals from two different manufacturers can work together provided only that both adhere to the international SDH standard—NKT equipment does not necessarily have to be located at both ends of the cable.

FINLAND

GSM Mobile Phone Net Operating in Cities

*91WT0149A Copenhagen BERLINGSKE TIDENDE
in Danish 2 Jul 91 p II 3*

[Article by Asbjorn Jorgensen: "Telephone Premiere Performance Had To Do Without the New Telephones"—first paragraph is BERLINGSKE TIDENDE introduction]

[Text] Helsinki—The general European GSM mobile telephone system held its premiere performance yesterday. Use of mobile telephones is increasing drastically, and the GSM is establishing entirely new standards for what a telephone can be used for—only there are not any telephones yet.

A telephone number will probably be on a businesscard soon. One is at liberty to tell others where one can possibly be reached during the weekend. Or on vacation, no matter where in the world one travels.

In the future, a portable computer can be plugged into a pocket telephone—for example, when an article is to be sent home from Finland—and not something with inconvenient telephone plug-in points and bad connections.

Those are only some of the special features that the new, European mobile telephone—the GSM system—possesses.

The system's premiere performance took place yesterday.

Premiere performance is perhaps putting it a bit strongly. Anyhow, the performance took place without the requisite props.

For although the GSM is theoretically ready to be used in many European capital cities—including Copenhagen, Stockholm, and Helsinki—there are no subscribers yet. And that is simply because there are no phones on the market.

That is owing particularly to an overly-demanding deadline.

The target date for the GSM's start was set for 1 July 1991, when 18 European countries agreed to comply with an EC directive regarding universal standards for mobile—movable or portable—telephones. That was in 1987.

At the same time, they took that occasion to break up the national monopolies, so that all the countries have two mobile telephone companies: one more or less public company and one that is entirely private.

Impossible Deadline

In Denmark, Teledanmark is the public company and the Dansk Mobiltelefon consortium, with Store Nord as its prime mover, is the private one.

At that time everybody predicted that it would be almost impossible to comply with the deadline. The prediction turned out to be right.

But the private Finnish company that is operating has gotten farther ahead than any other European company. The GSM can now be used in that country's three biggest cities: Helsinki, Tampere, and Turku. The territory is being broadened rapidly.

Nevertheless, the assembled European press was somewhat disappointed at the conference preceding the baptism itself in the beautiful Esplanade Park.

The fact is that Radiolinja, as the Finnish operating company is known, could only demonstrate the GSM using prototypes. To be sure, scores of "guinea pigs" are to move about with GSM telephones beginning today. But the Finns have a telephone system that is not open to subscribers.

"We have not gotten type approval for the new telephones," is the excuse of the Finnish electronics firm Nokia, which is responsible for the technical part of Finland's new GSM system. The specifications showing how the new telephones are to be constructed were not published until three months ago, they say.

BERLINGSKE TIDENDE asked how the fact that 1 July was made the deadline date was advantageous for the general customer.

Sari Baldhof, the administrative director of Nokia Cellular Systems answered as follows:

"For us, the most important thing was to be able to show that we could meet the deadline. Mass production will begin on 15 November, and 95 percent of Finland's population will be able to use the GSM in 1995."

FRANCE**Telecom-2 Satellite System Described**

91AN0491X Paris SCIENCES & AVENIR in French
Jul 91 p 18

[Article by Albert Ducrocq: "The Telecom-2 Program"]

[Text] The Telecom-2 program was introduced on 7 June. With a budget of 7 billion French francs—60 percent funded by France Telecom and 40 percent by the General Armaments Delegation (DGA) (each Telecom-2 will in effect have a military telecommunications mission due to a Syracuse [satellite communications system] payload—the Telecom-2 project consists of three satellites designed to replace the Telecom-1 system but with a much greater capacity: a life expectancy of seven to 10

years thanks to the larger fuel reserves; 26 transponders instead of 12; and a mass of 2,145 kg, compared to 1,210 kg for Telecom-1.

Telecom-2A will be put into orbit in order to be operational for the opening of the Albertville Olympic Games in February 1992. It will be joined six months later by Telecom-2B (which will allow Telecom-1A, in operation since 1984, to be withdrawn from service), while Telecom-2C will serve as a backup satellite. In addition to ensuring communications between Paris and the overseas departments and territories, Telecom-2 will have multiple applications, including distribution of television programs, emergency or standby links, transmission of digital data, business videoconferencing, and most certainly all sorts of planetary communications. Pierre Godimiaux, head of the Telecom project, noted that without orbital communications France would be deprived of direct communications with 62 countries.

Philips HDTV Equipment To Be Ready by 1994

91AN0478X Paris ELECTRONIQUE
INTERNATIONAL HEBDO in French 13 Jun 91 p 12

[Article signed E.F.: "Philips Will Launch Its High-Definition Television Sets in 1994"]

[Text] The Dutch group is proving its firm and definitive commitment to the HD-MAC high-definition television (HDTV) standard.

Philips has hit the ball into the court of its integrated circuit department. As the latter is to produce a sufficiently miniaturized HD-MAC decoder earlier than expected, Philips Consumer Electronics is already considering bringing forward the launch date of its HD-MAC receivers to 1994. The Dutch group is thus clearly demonstrating its commitment at a time when the European Commission in Brussels is in the middle of bringing out a directive making HD-MAC the sole standard for HDTV. Philips has also announced the introduction, expected next August during the Berlin international sound and video exhibition, of its 625-line receiver in 16/9 format fitted with a D2-MAC decoder. Thomson Consumer Electronics played the role of pioneer in this field a few months ago.

Despite the prohibitive cost of such a receiver, on the order of 30,000 French francs [Fr], the two manufacturers are now counting on the size of the image to attract TV viewers keen on new techniques. EC Commissioner Filippo Maria Pandolfi hopes to achieve a first reading of the directive during the July session of the European Parliament. If this directive is adopted, it will be valid for 10 years and will favor HD-MAC as the sole standard for HDTV. It sees D2-MAC in 16/9 format as an obligatory intermediate stage for all new satellite TV services. The existing services will be able to continue to broadcast in PAL [Phase Alternation Line], but they will be encouraged to broadcast a D2-MAC version as well, mainly through direct financial aid. On this latter point, Brussels has put forward a figure of around 100 million

European currency units [ECU] per year over five years. For the moment, no time limits have been set for broadcasts in PAL.

It should be noted that the official date for the introduction of HD-MAC receivers onto the market had initially been set for 1995. However, some 1,000 prototype 1,250-line TV sets in 16/9 format will already be available for the Olympic Games in Barcelona in 1992. These will be fitted with so-called second-generation decoders as currently produced by Philips.

GERMANY

Broadcasting Restructure, Regulation Sketched

91GE0365Z Frankfurt/Main FRANKFURTER
ALLGEMEINE in German 6 Jul 91 p 5

[Article by "Web.": "Seven Billion Marks From Fees"]

[Text] Frankfurt, 5 Jul—The decision by the minister presidents to drastically increase the radio fees, brings about hefty surplus incomes for the public radio institutions, but also brings with it a shift in the financing basis. Rapidly rising costs had led to the demand for either increasing fees or for extending the advertising restrictions on television, because on television no advertising commercials were thus far permitted to be broadcast after 2000—and this restriction will continue in effect. The additional fees of 4.80 German marks [DM] reflects the recommendations made by the Commission for Determining the Financial Requirements of the Radio Institutions (KEF) which had presented the special report a short while ago. Of the amount of extra fees involved, DM2.25 represent basic fees for radio reception and DM2.55 are television reception fees. Thus, beginning in 1992 the average household in west Germany will no longer pay DM228 per year for television, but rather DM285.60.

Next year, the cash registers of the institutions will thus be enriched by around DM7 billion, of which DM1.4 billion (740 million in basic fees and 711 million in television fees) will come from increases in the former Federal states. Advertising revenues will also add to the total financing (net advertising turnover will be approximately DM2 billion). In the new Federal states, monthly fees are to remain at DM19 for the time being. Another increase in the east would have been difficult to accomplish because fees there rose from DM10 to DM19 in October 1990, when the GDR radio system dwindled away. With the dissolution of the "Installation," which administers the remainder of the GDR broadcasting system, and with the transfer of the ARD institutions, the balance sheet must be revised again: Approximately 5 million households in the east now pay over a billion marks, which still flow into the coffers of the facility. This will change as soon as the new broadcast institutions of the eastern Federal states join the ARD and as soon as the states have signed the ZDF-state contract.

Fees have increased tenfold over seven decades. When they were introduced in 1924, they amounted to two Reichsmark. They remained the same even after the currency reform. At the beginning of the 1950's the fees were set at five marks. In 1968—in the meantime the ZDF also came into existence—the minister presidents of the Federal states signed a state treaty on broadcast fees which regulated increases in fees. In 1970 radio and television together cost DM8.50 per month. Twenty years later, the fee was DM19. In addition to these increases, the broadcast institutions' revenues also increased from fees based on the constant rise in the number of subscribers.

The private broadcasters, who have been permitted to exist since 1984, and who handle their revenues essentially on the basis of commercial advertising income, do not receive any of the broadcast fees. Of course, these fees are also not completely at the disposal of the institutions, because 2 percent is diverted to finance the state centrals for private radiobroadcasting. These institutions have the task of granting licenses to private broadcasters and of overseeing their programming.

Because no one as yet knows what the structure of the institutions in northeast Germany will look like, the minister presidents left open the appropriate regulatory language covering financial equalization between the institutions. With respect to satellite television, the chiefs of state are engaging in cost stabilization: The reworked fundamental broadcasting state treaty, which, when presented, contained language which annoyed the private competitors and noted that the ARD and the ZDF would be permitted to share additional satellite channels—perhaps a sports or a news program—was modified during the course of the consultation sessions. Now, a decision by the minister presidents is said to be desirable.

The planned establishment of a common umbrella organization of the ARD and the ZDF for Deutschlandfunk, RIAS, as well as the DS Kultur broadcasters is not considered by specialists to be the least expensive solution. But it has the advantage of not letting either the ARD or the ZDF—both had made particular efforts to acquire Deutschlandfunk—feel that they have been left out. A new Federal broadcasting structure requires an amendment of the Federal Broadcast Law—in other words, Parliament must make the decision. However, the Federal finance minister will be happy to see the proposals of the minister presidents adopted, because the joint facility which is to be established is supposed to be financed on the basis of a 75-pfennig share of the fees. Hitherto, the (commercial-free) Deutschlandfunk has cost the federation more than DM100 million per year; and RIAS is clearly more expensive.

Several details which are to be exclusively regulated by the states still remain open. Thus, the composition of the oversight groups within the ZDF must be modified after

the new Federal states have joined. Moreover, no decision has allegedly yet been made regarding the advertising policy regulations to prevent the overly excessive accumulation of power on the part of multimedia enterprises.

Broadcast Media Restructuring Cost, Contours

91GE0372B Hamburg DIE ZEIT in German Vol 46
No 27, 28 Jun 91 p 30

[Article by Marie-Luise Hauch-Fleck: "Expensive Fun—The Minister Presidents Are Not Concerned With Viewers, but With Prestige"]

[Text] There is currently a lot of talk in Germany about saving and sharing. The media politicians of the Federal laender, however, are sovereignly putting themselves above such demands. While the media landscape of the ex-GDR is being changed totally, the minister presidents in the west are stubbornly fighting to make sure that everything in their laender remains the way it is, whatever the cost may be.

The west Germans want to hold on to even the broadcasting stations that have really become superfluous since the fall of the wall: Radio Germany (DLF) and Rias Berlin. The Cologne broadcasting station was founded a few weeks after the wall was built in 1961. Primarily, it was supposed to provide the citizens of the GDR with news and information from the West. All along it has been subject to a constitutional dispute between the Federal Government and the laender, because under the Constitution the radio network is the responsibility of the laender. But the DLF is a Federal institute. With 107 million German marks [DM], Bonn provided two-thirds of its budget last year. The ARD [Working Group of FRG Broadcasting Institutes] paid the rest (DM52 million). Just a year ago, even the CDU [Christian Democratic Union] admitted "that since the unification of the two German states an important part of the previous mission of DLF no longer exists."

That is also true for Rias in Berlin. The station founded by the Americans in 1945, for which the United States Information Agency has had control of the programs and transmission since then, was likewise supposed to impart Western values to the East Germans. Although owned by the United States, the Federal Government financed Rias almost by itself: with more than DM170 million annually toward the end. Washington settled for a rather symbolic contribution of DM3 million.

Instead of making use of the possibilities to save almost DM300 million, the politicians after the reunification have discovered a new justification for the existence of the two "freedom broadcasters." In the future, they are supposed to broadcast throughout the nation to close the rift between the easterners and westerners. The east Berlin broadcasting station DS-Kultur, which has shrunk to less than 100 employees, is also allowed to contribute

as an east German fig leaf. An information program without advertising and a culture program—whatever that is—is planned.

This basic decision, however, is the end of the common interests among the minister presidents. When they meet on 4 July to consult on the reorganization of the radio broadcasting system, there will be no fewer than five models on their table on how these three institutes should be converted for new tasks:

- Rias, DS-Kultur, and DLF will be combined into an independent institute;
- The three broadcasting stations will be continued as joint stations of ZDF [Second German Television Program] and ARD
- Rias and DF-Kultur go to ZDF and DLF goes to ARD;
- All three stations are brought together under the ARD;
- All three stations go to ZDF.

It is still completely open which alternative will ultimately be approved. Questions of location and image are of decisive importance for the laender. Party affiliation as an element to regulate different interests is of no account. Thus, North Rhine-Westphalia governed by the SPD [Social Democratic Party] would not by any means like to lose the DLF to any other land and would rather expand the Cologne program than dismantle it. And the people in Berlin are fighting for Rias, which is headquartered there.

To be sure, Rudolf Sharping, the new minister president of Rhineland-Palatinate, has yet to learn that media politics is primarily oriented to power interests rather than to those of viewers. After the election, Rhineland-Palatinate let it be known at a meeting with other land representatives that the government in Mainz does not care whether or not the ZDF will be permitted to pursue sound broadcasting in the future. "We all looked at each other completely dumbfounded," says one participant. And ZDF Superintendent Dieter Stolte will greatly miss the support of the former CDU land government for his favorite project. So far the ZDF chief has not thought of a convincing argument for why radio broadcasting would be necessary in addition to television.

For his part, Dieter Weirich, superintendent of Deutsche Welle, definitely wants to do television. He wants to utilize the latest Rias branch, Rias-TV, as a germ cell for this. The program could be broadcast around the world by satellite and so he is seeking support for his idea of competing with other foreign broadcasters. The former media spokesman of the CDU is actively supported by the Federal Government in his drive to the picture medium. No wonder: After the reorganization, the Deutsche Welle is the only broadcaster that is entirely owned by the Federal Government. And after all, even Konrad Adenauer had dreamed of a government television.

So far the minister president has made only a very approximate estimate of what the media policy plans will cost the people who pay the charges. There is no precise cost calculation of what the various models will cause in additional outlays. In a working group, to be sure, representatives of the laender have sought at least to get an approximate overview. But the result is disputed even among SPD laender. Whereas Schleswig-Holstein considers a joint ARD-ZDF institute to be the comparatively least expensive solution, precisely that is the most expensive model in the opinion of the people in Hamburg. But it is already becoming apparent that none of the alternatives can be had for much under DM300 million

The chiefs of the new Federal laender have learned very quickly from their colleagues in the West that media policy is very well suited for locality and power politics if one only shows nerves of steel. Very obviously Alfred Gomolka, minister president of Mecklenburg-Vorpommern, has such nerves. Equally courted by SFB [Radio Free Berlin] and NDR [North German Radio], Gomolka continually raised the price for his assent. After an endless stalemate, his cabinet—the decision of the land parliament has not yet been made—decided last week in favor of a three-land institute with Berlin and Brandenburg. Gomolka saw to it that Mecklenburg-Vorpommern, as the smallest land, has the same weight in this association as Berlin and Brandenburg. Only the superintendent and the chief editor's staff for radio and television of the new broadcaster, Nora, are staying in Berlin. The radio directorate will be located in Schwerin, and Potsdam is getting the television directorate. No one knows how this model is supposed to function in practice.

The three members of the new Middle German Radio (MDR)—Saxony, Saxony-Anhalt, and Thuringia—have carefully made sure that no land comes up short in the development of the new media structure. The radio broadcasts are to be made in Leipzig and the television programs in Halle. By way of compensation, Erfurt is getting the advertising branch of the MDR. In addition, a land radio broadcasting center will be built in the three land capitals Dresden, Erfurt, and Magdeburg.

Such regional balance cannot be obtained for nothing. The rate payers in the west are to pay between DM1 billion and DM1.5 billion for the building of the new broadcasting stations. For the time being, the media politicians do not want to burden the east Germans with any additional increase in radio user fees, because they have already risen almost 100 percent from DM10 to DM19 after reunification. The interesting question is whether there will be any money there at all for programs when all positions are filled and all of the imposing buildings have been built.

ICELAND

Updated Phone Switching System Seen Needed

Ericsson Studying Problem

91WT0162A Reykjavik MORGUNBLADID in Icelandic
27 Jul 91 p 36

[Unattributed article: "Post Office and Telephone: In the Next Decade Aim Is Toward New Switching System"—first paragraph is MORGUNBLADID introduction]

[Text] The directors of the Telephone and Postal Service have been meeting for the past two days with a director from L.M. Ericsson, where, among other things, they have been discussing the cause of frequent breakdowns in the telephone exchange in the National Telephone Center and future changes in the phone system's software that will increase the reliability of the telephone service. Olafur Tomasson, director of the Telephone and Postal Service, said that at the meetings with Thorbjorn Anderson, director of Ericsson's automated telephone division, repair measures were being carried out that had begun yesterday and were being continued over the weekend. According to Olafur, these repairs consist chiefly of using a process of elimination to find the cause of the problem. Olafur said that he would therefore meet with Thorbjorn Anderson on Tuesday and Wednesday of next week and go over the results of the repairs at that time. Olafur said that changes in programming the computer equipment of the phone system had also been discussed for this winter. According to Olafur, these changes were on the agenda before the troubles at the telephone exchange at the National Telephone Center began, but the changes should contribute to greater reliability for the telephone system. Olafur said that the new system was the same kind that is used in Denmark; this way, Iceland will not be the only one using the computer system, and the experience of the Danes might be quite useful to the Icelanders. Thorvardur Jonsson, managing director of the Telephone Service's technical division, said that the switching software would be changed because Iceland runs the risk of being isolated with the system they currently have. Thorvardur said that if the Telephone Service has a switching system that no one else uses, any improvements would be very expensive. But if the same system as Denmark's is implemented, the cost of improvements and maintenance are reduced. Thorvardur said that they were aiming to set up the new switching system during the next decade. Thorvardur said that the breakdown in the telephone exchange in the National Telephone Center was not solely in the software because there were breakdowns in all the telephone exchanges. He thinks that an interaction between some units caused the breakdowns and that they were in both the mechanical equipment and the software in the downtown exchange. Thorvardur said that the system was being examined piece by piece, and patience was needed.

System Suffered Failure

91WT0162B Reykjavik MORGUNBLADID in Icelandic
28 Jul 91 p 4

[Unattributed article: "Post Office and Telephone: Due to Breakdowns, Director From Ericsson Met Directors of Telephone and Postal Service"—first paragraph is MORGUNBLADID introduction]

[Text] A director from L.M. Ericsson, Thorbjorn Anderson, was expected to arrive in Iceland yesterday for today's meeting with the directors of the Telephone and Postal Service to discuss the previous frequent breakdowns in the telephone exchange at the National Telephone Center. Two technicians from the Ericsson firm had previously remained in the country to investigate the causes of the breakdowns, but no explanation has yet been found. Thorbjorn Anderson is a director of those divisions within Ericsson concerned with the design, construction, and maintenance of automated telephone exchanges. He is coming to Iceland to discuss with Olafur Tomasson, chief director of the Telephone and Postal Service, and other directors of the Telephone Service, the breakdowns which, one after the other, had earlier disabled the telephone exchange in the National Telephone Center. According to Hrefna Ingolfsson, the Telephone Service's press secretary, Thorbjorn Anderson and other Ericsson directors have been in daily contact to monitor the investigation by the Ericsson technicians and the employees of the Telephone Service of the telephone exchange at the National Telephone Center. Hrefna said that at the same time as investigations are under way in Iceland, Ericsson employees in Sweden are working from the results coming from Iceland in order to find the cause of the breakdowns.

IRELAND**First Offshore Island Link to Satellite TV**

91WT0153A Dublin IRISH INDEPENDENT
in English 19 Jun 91 p 10

[Article by Tom Sheil]

[Text] Courtesy of Cablelink, Aran now has nine TV channels. It is the first island chain off the Irish coast to be linked to the satellite television network.

Prior to MMDS, the TV choice for the 1,500 or so people of Inismore and its smaller sisters, Inishmaan, and Inisheer, was limited to the two RTE networks. Now they also have BBC1, BBC2, UTV and Channel 4, Sky, Sky News and Screensport.

Already 100 homes—70 on Inismore, 30 on the two smaller islands—have been hooked up by Cablelink. That's out of a total potential of about 1,500 connections on the island.

Says Cablelink manager in Galway, John Moore O'Connor: "The take-up signifies that there is great demand for our service here."

Good public relations is part of the Cablelink policy and yesterday John Moore O'Connor did his company's image on Aran no harm by presenting a set of football jerseys to the Inismore team.

The jerseys will be shared by the island's Gaelic and soccer teams. "Who knows, with Screensport now available, maybe next year there will be an American football team on Aran looking for sponsorship," quipped Mr O'Connor.

Telecom Eireann, Hungarian Telecom Joint Venture

91WT0173A Dublin IRISH INDEPENDENT
in English 27 Jun 91 p 4

[Article by Cyril Hardiman: "Hungary Deal Major Boost for Telecom"]

[Text] Telecom Eireann is confident of winning further major contracts in Czechoslovakia, Estonia and elsewhere in Eastern Europe as a result of its breakthrough in Hungary.

The company yesterday announced a joint venture with the Hungarian State telecommunications company MATAV to finance the development of the country's telephone system, partly through Dublin's International Financial Services Centre (IFSC).

The overall cost is estimated at \$5 billion over the coming 10 years.

Telecom has also won a five-year consultancy contract, worth £375,000 a year in fee income, to assist in the development and provide project management expertise to the Hungarians.

And its chief executive, Fergus McGovern, believes there will be other opportunities resulting from this link-up, both in Hungary and elsewhere in Europe.

"Czechoslovakia has expressed similar interest and a deal is very much on the cards," he told a news conference in Dublin yesterday.

Telecom has also had contacts with Estonia and Poland and "there will be others," Mr. McGovern confidently predicted.

The Hungarian contract will give Telecom and its subsidiary Irish Telecommunications Investments (ITI), the company which has financed the £1.2 billion upgrading of Ireland's network over the past 10 years, an international status in seeking to export its financing and project management skills.

Tony Flynn, ITI's managing director, said: "We'll cut our teeth on Hungary and be ready to take on others in 12 months."

The Hungarian approach is almost a carbon copy of the development of Ireland's telephone network, which commenced in 1981.

They have set up a finance company, Investel, along the lines of ITI.

Through ITI, Telecom is investing £2.5 million for a 20.1 p.c. equity stake in Investel, and will have a 60 p.c. interest in the joint-venture IFSC company, Investel International, which plans to employ "at least" 11 people.

Another four technical people from Telecom will be seconded to the Hungarian development.

A Hungarian will head up Investel, but its international funding and project management functions will be filled by Irish people.

Mr. McGovern declined to put a value on the whole Hungarian link-up, but stressed: "We're not primarily into earning big money—this is a strategic operation."

ITALY

Research Centers Sign Accord With French

91MI0333X Milan *SISTEMI DI TELECOMUNICAZIONI* in Italian Mar 91 p 66

[Text] France's CNET (National Center for Telecommunications Studies) and Italy's CSELT (Telecommunications Study Center and Laboratories) have signed an agreement in Turin to carry out joint research activities.

The goal of the agreement, which sees the STET [Turin Telephone Company] group's research center and that of France Telecom working together, is to broaden and exchange expertise for the development of highly innovative solutions in the telecommunications sector. The following five research themes have been identified to date:

- evaluating the quality of software;
- managing network traffic;
- voice synthesis from written text;
- semiconductor optical amplifiers for high-speed optical fiber networks;
- methods for the rapid design of integrated circuits.

It is expected that other areas of common interest will be the focus of future studies.

Technological progress and the pressing need for new services in the global market are currently driving all the managers of telecommunications services toward a substantial commitment in research and investment for large-scale network innovation using the most up-to-date and effective solutions. This requires the rapid definition of international standards to ensure uniform network services and promote a growing liberalization of the market.

The initiative by CNET and CSELT is a concrete response to these problems and a contribution to the construction of European telecommunications.

The agreement complements a broader action by the European managers of telecommunications services, who propose the formation of a common European structure, EURESCOM, to coordinate joint research projects and promote the harmonious development of telecommunications networks and related services at the European level.

Telespazio To Control Italsat Satellite Orbit

91MI0337X Rome *AIR PRESS* in Italian 17 Apr 91 p 842

[Text] Telespazio [IRI-STET [Industrial Reconstruction Institute - Turin Telephone Company] has taken over the complete management of the ASI's (Italian Space Agency) Italsat telecommunications satellite from ESOC [European Space Operations Center] in Darmstadt. The first experimental transmissions will begin this summer. After a period of joint management, which began immediately after the satellite's launch on 15 January, the ESA's (European Space Agency) ESOC center and Telespazio completed the transfer of responsibilities for the control and management of Italsat while in orbit. Telespazio's Fucino space center followed Italsat's transfer into orbit from the very beginning, acquiring telemetry signals; and acting as the primary control station for the orbiting Italsat on behalf of the ESA. After the positive results of this collaboration, the transfer of duties phase began and was terminated in the past few days. Telespazio manages the satellite under a contract with the ASI and for this reason it established the Fucino control center, the telemetering stations and remote control station (in the S band) to guide the satellite and for telecommunications (in the KA band), and two reference stations for the satellite's antennas, located in Cagliari and Courmayeur, near Aosta. Italsat is in a geostationary orbit 36,000 Km from Earth and 13 degrees longitude east of the equator, in correspondence with the meridian of Rome.

SWEDEN

Telecommunications Privatization Examined

91WT0155A Stockholm *TELE* in Swedish No 2/91 Jun 91 pp 24-28

[Article: "Deregulation Without Tears"]

[Text] The appearance of a totally free telecommunications market and growing international involvement were the most important events of the 1980's, according to Kurt Katzeff. In a way, the technological changes have been more predictable, with one notable exception—the handling of software.

Kurt Katzeff managed to gain the confidence of LMT by making them realize just how they should go about

developing software. This facilitated the effort to promote cooperation with them.

Software had been a stumbling block for Ericsson, as it was for ITT's companies in Europe. To be sure, the leadership in Brussels realized that they had serious problems. The computer expert they hired to clear up the matter was a capable man, but he understood little about telephones. Consequently, one of Katzeff's first jobs was to explain to this expert the specifics of software that is designed for use in telephone systems. Eventually, improvements were made, such as the structured design method used in producing software and, for example, real-time operating systems.

A Real Gain for STC

Another effort that yielded tangible results, which was presented in the business journals long after Kurt Katzeff had left ITT, had to do with the English ITT company STC. The standard English system TXE4 was being developed by the British Post Office (BPO) together with its suppliers. For various reasons, the development time for this relatively conventional system was extremely long and, as a result, it was antiquated even before it was to be put into operation. At that time, the idea of developing a new, more modern version came up. Since it was ITT policy for such a new development to be approved by the Brussels office, Katzeff was given the task of examining the STC proposal for a new system which, however, was not very advanced. As an example, it did not make use of microprocessors, even though by that time they were readily available. Katzeff raised this criticism with the British, who claimed that their customer, the BPO, would never approve a system with microprocessors. Of course, this conflict was quite sensitive. What happened was that just about every Monday for two months Katzeff went to the technical director of STC to discuss the question. Finally, the Englishmen became tired of the obstinate Swede and the STC technicians contacted the BPO once again. The BPO said that obviously they expected a system that made use of microprocessors. Eventually STC withdrew from the telephone station market. For a long time, however, it made a living by being the only supplier of this microprocessor-based system, the TXE4A, which was the only system that British Telecom installed until the more modern System X and System Y became available.

The ambition of creating a single digital system for interurban stations also proved to be extremely difficult to implement. LMT, the large French company, was particularly unwilling to sacrifice its own ideas for the sake of something that was proposed by Brussels. To achieve a solution, Katzeff called the LMT chief and they agreed to meet at the LMT office in Paris. Katzeff took the morning train down to Paris the next day. During their discussion held over lunch, in which the chief engineer of LMT also participated, Katzeff finally handed the chief engineer a menu and asked him to write his specifications for a joint system on the back (it later turned out that they were not all that different from

those produced in Brussels). After lunch Katzeff took a copy of the menu to the head of ITT's Engineering and Design Center in Paris and they used this somewhat unusual spec sheet as a kind of preliminary system specification. The reason why it was so important to produce a uniform interurban system was that the people in charge of ITT Europa realized that the times were changing. The technology that they had sold up until then, an electromechanical system, did not require any enormous sales volumes, but when the digital systems appeared it became clear that, for example, they would need only one factory to meet the needs of England and one for France, where there had been four or five factories before.

Ominous Sign

The interurban system that resulted from this was a good design, although it was never a big seller, but that had to do with the next important phase in the history of ITT which, for ITT's part, eventually meant that it sold off its telephone operations in Europe, and for Kurt Katzeff's part, that he returned to Sweden.

There were ominous signs that ITT would not survive into the future. The first serious crisis had to do with political developments in France. In the late 1970's there was a tough presidential campaign between the Socialist candidate Francois Mitterand and the Gaullist Valery Giscard d'Estaing. The Socialists wanted to carry out an extensive nationalization of industry, including the telecommunications industry. Harold Geneen, the top chief for the entire ITT concern in New York, saw this as an extremely serious threat and Katzeff, together with the chief of CGCT, was given the task of developing a kind of emergency plan in case the Socialists took over the post of president. Instead, Giscard d'Estaing was elected. Then events followed a different course: The French company PTT solicited bids on a digital electronic system, listed certain requirements, and finally chose a system from CIT Alcatel and one from ITT. In order to supply the system, however, ITT was required to sell its largest company, LMT, to the French company Thomson, just as Ericsson had to sell its French company.

Ericsson quickly accepted the new rules of the game, contingent, of course, on the opportunity of selling its AXE system in France, which it managed to do. Thus, when this entire process of structural change was over, ITT no longer had its largest French company. The winner, on the other hand, was CIT Alcatel and not Thomson. In the process of closing down this operation, Kurt Katzeff was given the task of transferring technology from LMT to the other ITT companies. ITT had a general license agreement, which meant that each company had the right to use all the know-how that all the other companies working in the same field possessed. In return, the ITT companies paid 3 percent of their gross profits, which ITT used to commission research and development either at laboratories or directly at the various companies. This was one way for the central staffs to control development.

Trans-Atlantic Leadership

To coordinate the work of headquarters in New York with the European operations, Harold Geneen came over once each month and held a large open meeting lasting several days to go through all activities in Europe. This meant that all the chiefs risked being yelled at openly if New York was dissatisfied with their results. But, of course, this also meant that the leaders were always forced to be on their toes.

For natural reasons, Kurt Katzeff was in close contact with Geneen during this time. Geneen felt that the Europeans were far too slow to adopt ideas from the United States. On one trip to the United States, Kurt Katzeff ran across a clear indication of this mistrust. In the United States, a number of Bell Laboratories engineers had been given the task of developing a new, totally electronic system for Europe, although the Europeans were not informed of this. Battles for and against various solutions, conflicts between ITT's Europeans and Geneen's Americans, coupled with the power struggle that developed when Geneen stepped down, created an unpleasant atmosphere within the company, to say the least. When Geneen was about to retire, he had his own candidate for a successor, Rand Araskog, while the banks backed ITT finance director Lyman Hamilton.

In the late winter of 1957, four prominent guests from Ericsson visiting the Bell Laboratories' Morris Symposium ran across the term "software" for the first time. They had no idea what this would mean for the future. Eventually, however, everyone having anything to do with manufacturing telephone exchanges and other telecommunications systems, telephone service administrators, and telecommunications operators would have the same experience: Software was the common theme in every tale of why the first steps into the new electronic age were so faltering. After all, in all other respects the outlook was so promising: With the help of software control, features could be added and removed, services that customers could not even dream about in the past could be offered, the telecommunications network could be made to serve as one large programmable communications machine, and the network in its entirety could be controlled from a few central locations, all thanks to software. "Just a small matter of programming." But everyone underestimated both the difficulty involved in developing efficient and reliable new software and the care with which the software must be handled, for example in introducing new features at new exchanges, in order not to cause breakdowns and serious disruptions.

After helping start up Ericsson's AKE program and trying to bring the European ITT companies into the modern PMS world, Kurt Katzeff returned to Sweden and began his new job as assistant to Torsten Larsson, technical director at the Telecommunications Service in the early 1980's. At that time, he found that the software crisis was just as great in Farsta as it was in Brussels. Later he would devote much attention to this problem.

Investment in New Companies

One of the first concrete steps was the establishment of Telelogic, later Telesoft, whose activities are now included in the new development companies of the Telecommunications Service. Through a number of spinoff companies, the parent company also tried to attract the top Swedish researchers in the software field. In retrospect, it can be said that as an export company, Telesoft was not the success they had hoped for, and that it would be difficult to combine development work on the computer language Ada, which had yielded such good results within the Telecommunications Service, with pure product sales.

At the same time, however, much of the work at Telelogic was commissioned by the Telecommunications Service and this work was of significant value in producing software for operation and maintenance. There were other important results worthy of note, as well.

Reorganization

"The production work surrounding the SDL computer language gave a significant lift to future work with software. We also learned a lot working with Ada and we gradually put this knowledge to work at the Telecommunications Service. We have gained skills in this area that will surely be of use for at least 10 or 20 years to come."

In 1983 there was a reorganization at the Telecommunications Service. This meant that network activities at the technical section were combined with the network planning section, so that a new network section was formed. Products liability for terminals, equipment, and services was transferred to the marketing section. Some activities were transferred to Teli. A number of common services and functions, such as standardization, the central laboratory, the design laboratory, the instrumentation office, the drafting office, the central library, and others were transferred to the newly formed Basic Technology Section, where Kurt Katzeff was in charge. A small group under the leadership of Rune Bernemyr was also transferred to this section from the technical section. Previously, this group had worked in development and, among other things, it had participated in several research projects that were part of the so-called COST Program in Europe.

Kurt Katzeff's fellow workers can attest to his enthusiasm and energy in beginning new projects, but also to his ability to act with care and concern for those involved when it is deemed necessary to discontinue or cut back on some activity. As we know, changes came much more rapidly during the 1980's. More and more ongoing activities were critically examined. In some cases this meant that activities were shut down and, in others, new goals were set and the work force was reduced. One example of the latter occurred at the design laboratory. During the early 1980's it was an experimental workshop with about 100 employees, which was an asset during the electromechanical age, but now it was

surpassed, in part, by new technology. When the non-socialist government began to free up the telecommunications terminal market in 1980, a special office was set up to approve equipment used to connect customers to the telecommunications network. The office was located at the Basic Technology Section. With these resources, a laboratory with a reduced staff and the approval office, the new testing laboratory began operating with about 20 employees. Compared to other testing laboratories, at least those in Europe, the new laboratory maintained an exceptionally high standard, particularly with regard to testing data communications protocols.

Deregulation of the 1980's

The Basic Technology Section would play a key role in deregulating the remaining obstacles to total competition on the Swedish telecommunications market.

During this period, the Telecommunications service was often criticized, particularly with regard to equipment approval, where the credibility of the service was questioned. Kurt Katzeff's method of countering this criticism was that every time a serious article was published on the subject, he would contact its author and discuss with him in detail the issue in question, get the critic to ask questions and try to understand the historic background behind why the telecommunications network had the structure it had, to convince him that changes, even desirable ones, could not simply be made at the wave of a hand, and to point out that the Telecommunications Service was responsible for making sure that new equipment did not have a detrimental effect on the quality of the network. In retrospect, Kurt Katzeff believes that this method worked quite well. When the last so-called monopoly breakup was carried out in the summer of 1989, when the PABX market was opened for competition, it occurred in an almost remarkably undramatic way, considering the storm of public opinion during the early 1980's. The State Telecommunications Board which, with the exception of frequency management, took over the administrative tasks of the Telecommunications Service, was made a simple and unbureaucratic organization.

"The remarkable thing was that perhaps we in Sweden did not realize that we would be practically the first in Europe to carry out a sensible deregulation."

Deregulation, to an even greater extent than technical developments, was the great revolution in telecommunications, according to Kurt Katzeff. One reason why there have been no great changes in the market is that for the major multinational suppliers, Sweden is a very small market, which means that the competition becomes serious only when new equipment and new services are introduced.

Questions About Research

We must always ask questions about the purpose and usefulness of research and development, according to Kurt Katzeff. One person who had to answer quite a few

questions about his work during the late 1980's was Lars-Erik Eriksson, who led a group of researchers in the field of picture coding. It was clear, to be sure, that the quality of their work was high, but what use was it to the Telecommunications Service? Lars-Erik Eriksson pointed out that the research conducted by the picture coding group was of such high quality that the group was invited to participate in the broadband research project that was then taking shape within the EC. Under the condition that the group would actually participate, Katzeff was prepared to let the group continue its work. He soon received a positive answer when the picture coding researchers were allowed to participate in the definition phase of the RACE [Research in Advanced Communications in Europe] programs.

Historic Elevator Ride

By now the question of participation had become much more important and high-level discussions were held at the Telecommunications Service as to how they should proceed.

It was in this situation that the member of the EC Commission who was responsible for research and development and industrial policy, Narjes, came to visit Ericsson headquarters in Stockholm. From the Telecommunications Service, then-general director Tony Hagstrom, Johan Martin-Lof, who was in charge of international questions in overall planning, and Kurt Katzeff had an opportunity to meet with him (although Hagstrom did not appear until after lunch). Katzeff mentioned to the hosts that the Telecommunications Service would like to speak with the visitors about possible participation by the Telecommunications Service in the broadband project. Contrary to all the rules of good tact in international cooperation, Katzeff raised the question with Narjes during the luncheon. Narjes reacted favorably to participation by the Telecommunications Service, but he left the details to his assistant. The assistant pointed out, however, that the regulations would not permit the Telecommunications Service to participate. The luncheon had been held in the visitors' dining room at the very top of Ericsson headquarters and the guests were then scheduled to watch a presentation in the lecture room all the way down on the bottom floor of the same building.

Kurt Katzeff described what happened next in the following manner: "Big, strong Narjes entered the elevator first. I went in after him. Narjes stood in a corner and I stood in front of him. I told him that, according to his assistant, we could not participate in RACE. Narjes probably felt that the elevator would keep going down to an extremely warm place if he did not respond, so we talked throughout the entire elevator ride. To Narjes' delight, the elevator stopped at the bottom floor and we climbed out. Narjes spoke with his assistant for a while. The assistant came up to me and asked for a telephone to call Brussels. A telephone was found and after a telephone conversation that lasted three quarters of an hour the assistant went back to Narjes and gave him a brief

answer. Narjes then called me over and said that the Telecommunications Service could participate if it could pay all its own expenses. The expenses are no problem here, I said. At that exact moment, Tony Hagstrom came in and in some way or another he understood immediately what was going on. He said that, by all means, we would pay our own expenses if we were allowed to participate."

Unexpected Bonus

Thus, in this way, the Telecommunications Service was able to participate in the definition phase of the RACE program. To be sure, one year later the so-called Luxembourg Agreement would give all EFTA countries the right to participate in the RACE program but, since the Telecommunications Service was able to participate in such an early stage, it knew precisely what it was getting into. At this time, Katzeff's earlier work at ITT became useful: It turned out that many of the staff members who had to leave ITT because of the heavy-handed changes at the Brussels office earlier, people who had been Katzeff's close colleagues, were now either consultants for the commission or they had some direct link to the commission. This opened up completely new opportunities for finding out how EC cooperation took place in reality.

Now that the RACE program is continuing with RACE II, the Telecommunications Service will participate in this phase as well, although with more selective tasks, meaning a certain concentration of resources compared to the first phases.

RACE is just one of many examples of how during the late 1980's the EC came to play a key role not only in regional, but also in international cooperation in the telecommunications field. Research was one area of strategic importance and standardization was another. The EC Commission was dissatisfied with the pace of standardization work, particularly at CEPT [Conference of European Postal and Telecommunications Administrations]. Moreover, CEPT included administrations only. At a meeting in Stockholm that was part of the Eureka research program, Katzeff and Johan Martin-Lof began talking with Carpentier, the DG XIII chief, about the question of participation by the Telecommunications Service in the research and development program of the EC. Carpentier, for his part, brought up the question of standardization that he believed was a serious problem. "Then I asked him why the EC had not set up a standardization institute in Europe. Carpentier asked whether, if this were to happen, the Telecommunications Service would support it. I said it would."

ETSI

Of course, it was not just this proposal that led to the establishment of ETSI [Executive Telecom System, Incorporated], but the results of this discussion certainly supported Carpentier and made it easier for him to keep working on this issue.

It is also clear that, once ETSI was established, standardization came into focus in a totally new way.

Both RACE and ETSI are examples of how the EC has tried to promote its own information science industry in competition with North America and Asia. In addition, the European broadband net gave business and management access to telecommunications tools in as systematic a manner as possible. With regard to the information science industry itself, it is clear that the sector that works with terminals and computers has problems and there is stiff competition from American companies such as IBM, Digital, and Apple, while the European telecommunications industry, including Ericsson, Siemens, and Alcatel, among others, is quite strong today.

NMP Program

Despite difficult economic conditions in Sweden during the 1980's, the government used various programs in an attempt to promote Swedish research and industry in the field of information science, although the amounts were modest compared to investments in the EC. Sweden will never give billions in subsidies, such as the French Government is giving this year to the unprofitable Bull computer company. When the Social Democratic government took over in 1982, there was a proposal to begin a National Microelectronics Programs [NMP], which would have to find financing. They tried to obtain the money from the military, the Telecommunications Service, and the Board for Technical Development [STU]. The Telecommunications Service conducted some tough negotiations at the department level under the leadership of Kurt Katzeff. The Telecommunications Service then became involved in the project in areas where it thought it could make a contribution, such as gate matrices, design systems, and quality. From the standpoint of the Telecommunications Service, according to Kurt Katzeff, the most valuable part of the NMP program was that important contacts were made and competence in this area was gradually built up on the national level.

A Lift for Research and Development

This was followed by the so-called Information Science Program in which the Telecommunications Service, through Tony Hagstrom's donation of the so-called submarine money, came to play an important role. The background to this was that for three years the Telecommunications Service was to be forced to pay 100 million kronor annually to strengthen Sweden's submarine defenses. According to Hagstrom, it would make more sense to invest this money for three years in a Swedish information science program. The STU added 30 million kronor to this money and 40 million came from the military. Fifteen million of this 100 million kronor was sent, in turn, to the so-called Demotel program.

The IT4 program has given a genuine lift to research and development in certain areas of the Swedish information science industry, according to Kurt Katzeff, and this has also given a lift to the Telecommunications Service,

particularly from projects dealing with optical technology and software. Still, the most important advance has been the accumulation of know-how rather than the production of purely commercial products.

The Telecommunications Service has also played an active role promoting research and development in other areas of information science in Sweden. One example of this is that Kurt Katzeff and others helped establish SICS, the Swedish Institute for Computer Science, which works with advanced programming methods and advanced computers. In addition to SICS, the Telecommunications Service has also supported research in optical technology at the Institute for Microelectronics and at the Institute for Optical Research. We should also mention the Swedish Institute for Systems Development, SISU. Work done both in the IT4 program and at SICS can be expected to provide concrete results in new Swedish telecommunications systems during the 1990's.

International Contacts

One thing Katzeff missed at the Telecommunications Service in the early 1980's was the opportunity to obtain information on international developments. Both Ericsson and ITT offered this opportunity. As a result, the technical attaches came to play an important role as channels of information, so that important information could be obtained quickly. Now the Telecommunications Service, particularly the overall planning section, has built up its own system of highly qualified workers abroad, so that the attaches may not play the same important role they did during the 1980's.

Another channel for research and development in the United States that should be mentioned in this connection is the joint project with the Massachusetts Institute of Technology, MIT.

The term "knowledge industry" now has a much more precise meaning than it did in the past. During the 1980's, the Telecommunications Service developed a specialty of international class in the field of Intellectual Property Rights, IPR. One of the most important agreements in this field is the one signed by the Telecommunications Service on Ellemtel, which describes in great detail how the two parties may utilize the results that come out of the joint development company. This is another specialty that Kurt Katzeff has cultivated. When he came to the Telecommunications Service from ITT, he discovered that Torsten Larsson was really the only person who had mastered these agreements. As a result of this, Rolf Pragsten was given the task of studying the Ellemtel agreement and this, in turn, led to activities in which the Telecommunications Service has license agreements with individual employees who make discoveries and other license agreements, for example, with AT&T.

Eurescom

At present, IPR can be expected to be of great significance in connection with the new research institute of

the European telecommunications agencies, Eurescom. It is still too early to say what will come of this new cooperation, which will make it possible for the agencies to carry out joint research and development projects more independently than they could if they relied solely on the commission's research programs. Whatever comes out of this new institute, knowledge of how knowledge will be handled during the 1990's will be a valuable asset.

Ericsson in Wireless Data Communications Race

*91WT0160A Stockholm DAGENS NYHETER
in Swedish 5 Jun pp 54-55*

[Article by Helen Ahlbom: "Let Go With Wireless Data"]

[Text] Ericsson and Motorola are now fighting for shares in the next big market after that of mobile phones—systems for wireless data communications. In a couple of years it is estimated to be worth 5 billion kronor in Europe alone.

People on the go do not want to be tied down anymore by office phone lines or data cables. Tomorrow's dreams of freedom require more than mobile phones and laptops. The next step is wireless communications; to be able to plug into the database at work from a boat in the archipelago.

The system already exists, although it is little known and hardly utilized. Sweden has had a nationwide mobile data system named Mobitex since 1986. It is similar to the mobile phone network but has been specifically designed for fast data transmissions by Ericsson and the Swedish telecommunications administrations, which jointly operate a company named Eritel.

In the beginning Mobitex was expected to experience the same kind of success as the mobile phone system. But so far it has grown very slowly. In April of this year there were only 6,000 subscribers (compared to about 500,000 mobile phone users).

But now Ericsson believes the time is ripe. The telecommunications administration estimates that there will be about 20,000 Mobitex subscribers next year.

Ericsson estimates that the number of subscribers to various mobile data systems in all of Europe will grow 1,000 percent by the year 1995. This means a total of 500,000 subscribers, a market worth 5 billion kronor, of which Ericsson hopes to grab half.

The reason for the optimistic prognosis is the rapid growth of laptop computers, the sale of which is estimated to increase from 300,000 this year to 700,000 in 1994.

"With more portable computers around there will soon be a greater demand for wireless data communications," says Erland Lonaceus, international marketing director for Mobitex at Ericsson Mobile Communications.

Today's mobile data systems are used mainly for traffic control. Taxis, busses, police cars, ambulances, trucks, etc., use the system to communicate via computer. But Erland Lonaus believes that new customers will find their way to Mobitex.

The new large user group is expected to consist of people on the road who need to communicate with their offices' central databases. These people could be service technicians or traveling salespeople who need to contact their respective companies' computer systems.

However, no one believes in an equally explosive growth in mobil data systems as was the case with mobile telephones. Mobile phones are consumer products which can be bought by anyone for a couple of thousand kronor and which are ready for immediate use. Connection to Mobitex requires a significantly higher initial investment because many applications require custom designed software.

Software for mobile data transmissions has become a bottleneck, hampering the growth of the portable computer market. The need for customized software was underestimated from the beginning, both by Ericsson and the telecommunications administration. There is still a shortage of good telecommunications software.

The telecommunications administration is responsible for installing and maintaining the Swedish Mobitex network, while Ericsson sells Mobitex equipment abroad. Ericsson has the know-how where terminals and networks are concerned but lacks resources to develop customized software. This is the reason for the soon-to-be-signed cooperative agreement between Ericsson and the American corporation, Digital Equipment.

Digital, which is the world's third largest computer manufacturer, wants to develop software and some hardware in order to offer its customers a comprehensive solution to wireless communication with their portable computers.

If Digital's customers elect to use the mobile data networks, for which Ericsson is providing the equipment, it could mean a boon for the Swedish system and could ensure rapid growth for Ericsson.

Digital's choice of Mobitex can be explained by the actions of Ericsson's main competitor, Motorola, who in March last year signed a joint venture agreement with IBM and formed a company named Arbis on a 50/50 basis.

Ardis helped IBM to open its internal wireless data network (delivered by Motorola in 1983) to external customers. About 30 companies have already signed up, among others insurance companies and parcel services.

The network covers about 400 cities in North America and has about 30,000 subscribers, of which 22,000 are IBM service personnel.

Ericsson's Mobitex network has already been installed in North America. A company named Ram Mobile Data installed its first mobile data network in February of this year. This network is scheduled to include the 50 largest cities in the United States.

Ericsson supplies the network equipment and has received an initial order for 350 million kronor. During the next five years, Ericsson expects additional orders from Ram amounting to 600 million kronor.

The telecommunications administration recently acquired a 5-percent share in Ram's British subsidiary, which has also chosen Mobitex. The company is going to install a mobile data network in Great Britain this year, and Ericsson has received an order for 225 million kronor.

Ericsson was defeated on the home front, however, when Taxi Stockholm chose Motorola's mobile data network for 75 million kronor.

"Motorola's fast response times, in spite of large quantities of data, was the deciding factor," says Bertil Leismark, data processing manager for Taxi Stockholm.

An even more critical loss for Ericsson was the choice by the German telecommunications administration, Bundespost, of Motorola for its pilot project in the area of Ruhr. It was a strategically important order, in spite of the fact that the order was only for about 30 million kronor.

In Germany, for the first time Motorola is going to install a public network, in other words, a network operated by the telecommunications administration and one which anyone can join.

"Therefore, we are going to make our technical specifications public at the end of this year in order to enable other manufacturers to make terminals for our networks," says Jan Gorm Pedersen, the representative for Motorola's mobile data communications in Scandinavia.

The technical designs of both of the main competitors' mobile data networks are quite similar. Motorola's closed design will become open, and criticism concerning the low data transmission speed of the Swedish Mobitex network has resulted in considerably higher speeds in the American and British Mobitex networks.

It is quite obvious that the competition between Ericsson and Motorola is going to be as intensive in the mobile data field as it has been in the mobile phone market.

UNITED KINGDOM

BBC Demonstrates New High-Quality Radio System

91WT0164A London *THE DAILY TELEGRAPH*
in English 19 Jul 91 p 5

[Article by Christine McGourty, technology correspondent]

[Text] A new high-quality radio system will be demonstrated for the first time by the BBC tomorrow.

Known as digital audio broadcasting, it offers compact disc quality and, through technological advance, prevents interference from tall buildings, hills and valleys, Mr. Mick Gleave of the BBC's Engineering Department said yesterday.

On display at the annual Radio Festival of the Radio Academy in Birmingham, the system is the outcome of a four-year £30 million research project. It could allow listeners to travel the length and breadth of Europe listening to the same station without the need to retune.

It provides "high quality, low noise and high fidelity," said Mr. Gleave. "People with compact discs have become used to high quality sound and are now looking for the same in their car radios."

He said it cut out the "swooshing and fading" that occurred when a receiver picked up direct signals from a

transmitter in addition to reflections from a building or hill. "It's been very cleverly engineered to make it immune to interference."

Engineers succeeded in preventing this by taking advantage of a human hearing phenomenon known as "masking" in which peripheral sounds are ignored.

"We have solved all the technical problems," said Herr Egon Meier-Engelen, project manager at the German Aerospace Research Establishment in Cologne.

"The only remaining challenge is to find a suitable radio spectrum to carry the service," he said in a New Scientist report.

The project has been rushed to completion before the World Administrative Radio Conference next year.

If the conference administrators agree to allocate the frequency bands the group wants, at about 1,500 megahertz, the system could be in service by the mid-1990s. Radios for it will be more expensive than existing ones, but prices would drop with a rise in mass acceptance.

Developed by the BBC and electronics manufacturers Grundig, Philips, Bosch and several other organisations, the system has already attracted interest in Japan and the United States.

The U.S. National Association of Broadcasters wants to buy technology rights and make the system a standard in North America.

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